The Iron Age

A Review of the Hardware, Iron and Metal Trades.

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The Weimer Blowing Engine.

The opinion is gaining ground among metallurgists that while much thought has been directed to a greater fuel economy in the blast furnace itself, too little attention has been given to the question of providing blowing engines of an efficiency equal to that attained with machinery in other branches of manufacture. Blast furnace engineers ought to be, and are, rapidly becoming very careful in this part of their profession, and give prompt expression to their appreciation of blowing machinery of true merit. Among more recent designs which is meeting with approval, is that invented by Mr. P. L. Weimer, whose first engine of this description was shown in motion during the Centennial Exhibition, and has since been operating the Pine Grove Furnace, Pennsylvania.

Notwithstanding the depressed times which followed the exhibition, orders came in with flattering rapidity, until at the present there are 10 anthracite, 9 coke and bituminous coal and 11 charcoal furnaces in eight States supplied with the Weimer engines. One pair of them, with blowing cylinders 5 feet in diameter and 3-foot stroke, are also employed in cleaning sheet iron by means of Tilghman's sand blast, at W. D. Woods & Co.'s Russia sheet mill, McKeesport, Pa., and are delivering 15,000 cubic feet of air per minute. Smaller engines have been constructed for foundry and forge service, and for gas generators and piston blowers, engines built upon the same plan, but operated by belt, have been erected in a number of localities.

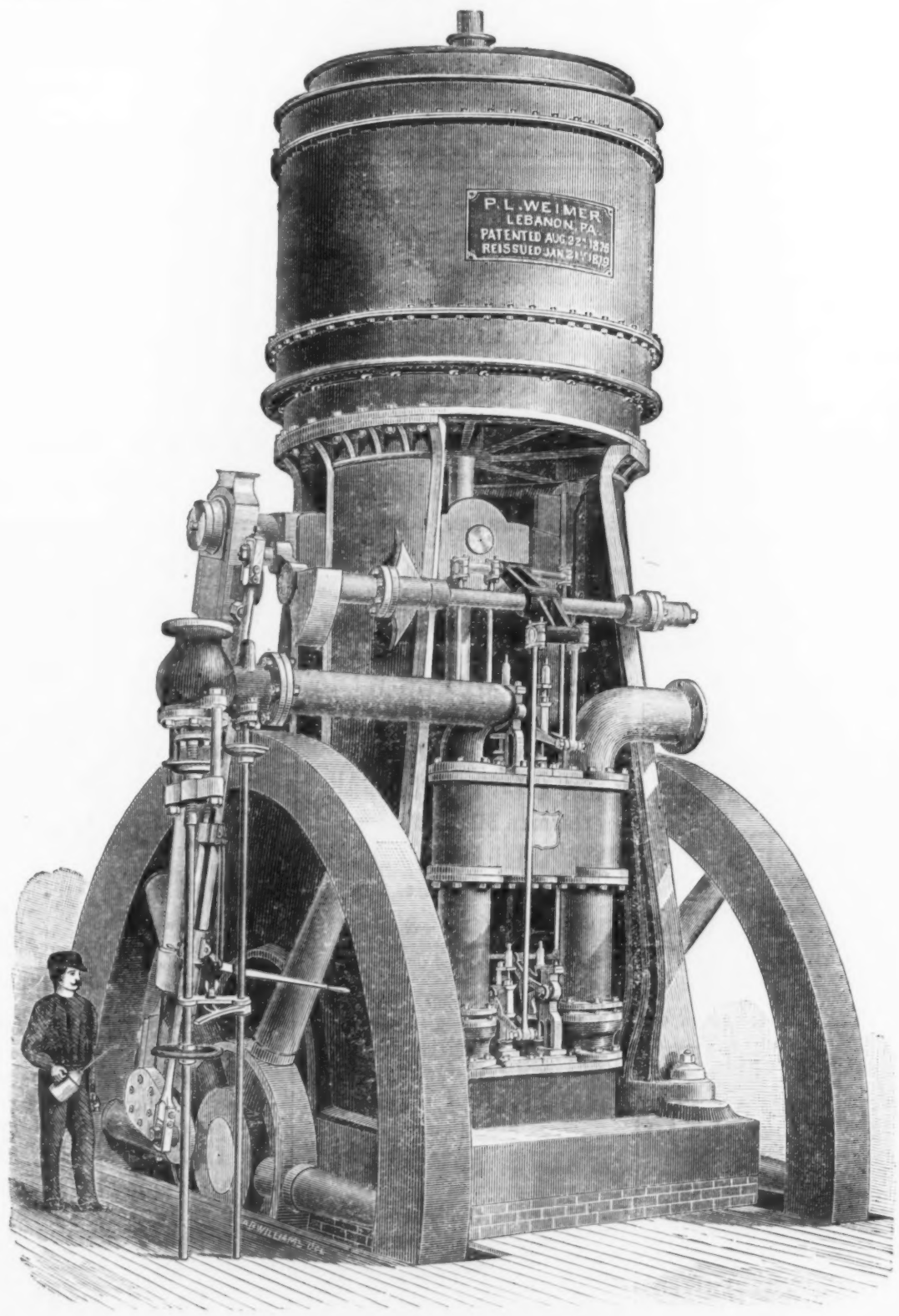
The massive, slow-moving, geared engine, formerly used in rolling mill service, and the large geared marine engine which was employed to drive propellers, had each been abandoned and direct connected engines of of the highest efficiency substituted, leaving the blowing engine, up to 1876, as the only relic of what has been termed "ancient engineering." For 30 years Mr. Weimer has been engaged in building blowing machinery, and much study and a large amount of money were devoted to improving it. Becoming convinced that it was possible to so construct a blowing engine as to obtain the full efficiency of the modern steam engine, he tried numerous experiments to overcome the difficulties in the arrangement of the blowing cylinders, for it was evident that the blowing engine could not be made to run at the speed of an ordinary steam engine unless the area of inlet opening was much greater than was possible with any arrangement of the valves in the flat blowing cylinder heads in use on the ordinary type of engines. No class of engine is so well adapted to rapid piston speed as the blowing engine, particularly when the design is vertical. The air in the blowing cylinder forms a cushion for arresting the momentum of the moving parts of the engine, and relieves the crank pins of this duty, incident to other quick-moving engines, when not met by early admission of steam or strong steam compression—two untenable positions in a well-constructed blowing engine.

In order to get an increased area of inlet, and at the same time secure a quick-acting valve which is not easily destroyed, the blowing cylinder heads are divided into sector-shaped recesses, each of which has a similar shaped valve box keyed into them. In each of the sector-shaped valve boxes there are five valves, four at the sides and one at the bottom, the top being left open for admission of air. A casing encircles the blast cylinder, and a series of valves act upon openings in the periphery, serving as discharge valves; the air passing into the annular space between the casing and cylinder, and thence through suitable connections to the receiver. The valves are made of sheet gum, perforated with rectangular ports, and working between gridiron seats and gridiron guards; the openings in seats and guards alternating so that when a valve is raised from its seat the air passes through the ports in it. The valves lift but 5-16ths of an inch to accomplish their maximum duty; the openings in gridironed seats and guards are ⅝ths of an inch wide. In order to expel all the air from the dead spaces between the valve boxes, the blowing piston is made in the form of a broad-faced pulley, 14 to 20 inches wide, on a ¾-inch web. Six or eight radial arms connect the hub (through which the piston rod passes) to the flange of the pulley on both the upper and lower sides of the piston, serving to strengthen it; and by passing into the spaces between the valve boxes, expel the air therefrom.

Owing to its peculiar form and arrangement, it is claimed that the engine illustrated can be run at any speed without injury to the air valves, and therefore a much smaller engine of the Weimer type than other styles of blowing engine can be used to do a given amount of work. The smaller engine means less expense for foundations, and for a protecting building, reduction of first cost, and decrease of cost of maintenance.

The steam valves are of the balanced poppet form, operated by double cams, so placed on peculiar shaped operating levers that the upper face of the cam works against a steel die on valve rod, and the lower face secures the positive closing and locks the valve to its seat. The motion of the rock-shaft is obtained through a telescoping operating rod, connected to a counter-crank working on the crank pin of one fly wheel. This operating rod is made telescopic so as to permit of "handling" the engine without unhooking at the rock shaft, and by means of a spring catch, the engine can be instantly thrown "in gear." The main shaft runs in cylindrical brasses turned to fit into bored bearings, and can be readily removed. The lower steam cylinder head is extended to form caps for pillow blocks, which are held in place by large housing screws pressing centrally on the upper bearing, and having large recessed receptacles for lubricants.

The piston rod is continuous, and extends through both steam and air cylinders. It is forged in one piece, having an eye formed in it at the center. The crosshead is also forged in one piece, and is slotted to receive the eye on the piston rod, to which it is pivoted by means of a neatly fitted pin. The ordinary gibs are dispensed with on the connecting rods, and a single key and large bolt used instead.



THE WEIMER BLOWING ENGINE.

The endeavor has been to construct an engine to meet the peculiar requirements of the blast furnace, to combine strength, simplicity and great capacity, and to furnish a blowing machine which can meet the varied demands of pressure and volume incident to furnace management, in as small compass as is consistent with the convenience in getting at the different parts of the engine. One of the special features in the manufacture of these engines, is that each one is set up complete, at the works where they are manufactured, and tested, in presence of the purchaser, if desired, to the maximum speed and volume which may be required of it under any emergency which may arise during its use.

In the engine house of the Henry Clay Furnaces, in Reading, Pa., there are two Weimer blowing engines, both substantially constructed and proportioned. One is an old style upright engine, 7 feet in diameter and 7-foot stroke; the other, a new style upright, 6 feet in diameter and 4-foot stroke; the smaller engine cost but half the amount paid for the larger. It drives the larger of the two furnaces, and has frequently shown a capacity for operating both furnaces with ease, which cannot be done as well by the larger engine. As another instance of the performance of these engines, we may mention that at Pottstown one of the new style engines, 7 feet in diameter and 4-foot stroke, is supplying blast for an anthracite furnace 16-foot bosh and 65 feet high, making 400 tons of iron per week, the pressure frequently reaching 16½ pounds. This engine is illustrated in the accompanying engraving. At Longdale, Virginia, one of these engines, having a blowing cylinder only 48 inches in diameter and 30-inch stroke, operates in connection with a water pressure engine. During the dry season of 1879 the furnace had to depend on the Weimer engine, and made with it 200 tons coke iron per week. When the size of the blowing cylinder and the work done are considered, this is truly a remarkable duty performed.

The Fannie Furnace No. 2, at Shawnee, Ohio, 50 x 13, using raw bituminous coal, is supplied by a new style Weimer engine with blowing cylinder 6 feet in diameter and 3-foot stroke. During an interval when the engine connected with No. 1 furnace (50 x 12) was stopped for repairs, both furnaces were satisfactorily blown by the Weimer engine through 12 4-inch tuyeres delivering 10,000 cubic feet of air per minute.

The Spring Lake Charcoal Furnace, in Michigan (11x47 feet) which has gained renown by producing an average of nearly 60 gross tons of pig iron in a day, is blown by a new style Weimer engine 5 feet in diameter and 4-foot stroke. The only objection made to this engine is that it is too large, it having developed sufficient reserve capacity to operate an additional furnace of the same size.

At present there are two machine works besides Mr. Weimer's shops at Lebanon engaged in constructing these engines, with the probabilities favorable to another works being added.

Cheap Sheffield Cutlery.

The *Engineer* writes as follows on a subject which has been attracting much attention of late:

It appears that goods purporting to be Sheffield cutlery, and marked "Sheffield," are being sent into the foreign markets in heavy weights, the intention being to compete with and undersell the German manufacturers. The material used in this sort of cutlery is cast metal. It is deeply to be deplored that there should be any rivalry in the production of such rubbish. It is certainly a serious business when the good name of Sheffield knives, forks and scissors is thus tampered with. Of late years the Sheffield manufacturer has had to contend against the importations of German firms who have aimed at cheapness rather than quality. These goods, like the famous razors, were made to sell and not to wear. But there was always this redeeming feature about it; the Sheffield cutler could say that these goods when stamped with "Sheffield" bore a lie on their face. They were, as a matter of fact, made in Germany, and sent to Sheffield, whence they were re-sent to the various markets of the world. Now it is no longer possible to say that the wares are not of Sheffield make, for certain dealers are getting them made in Sheffield. Purchasers in foreign lands will buy the goods, thinking they are of Sheffield steel, and when they have tried them a few times the cast metal will make itself apparent. The rage for cheapness is encouraging a competition in a quality of articles which cannot fail to bring an important industry into disrepute among all who are deceived. The Cutler's Company was formed to prevent such industrial deception and to maintain the high reputation of all Sheffield articles with a cutting edge; but it is difficult to see how the trade is to be stopped. Dealers, of course, could prevent it; and customers abroad have no mean power in their hands. Standard houses brand all their goods with name and trade-mark; and there is scarcely a maker who has a reputation to lose who does not in some way indicate the work of his hands. If customers would decline to buy goods which did not bear the makers' names, they would do much to limit the mischief which may be wrought; if they would do more—keep a keen watch on scissors particularly, and when they are deceived by cast metal for steel, let the dealer or maker know that he was found out—the supply of dishonest goods would soon be a game which would not be worth the candle.

The Preservation of Railroad Ties in Germany.

Herr Funk, a prominent railroad official of Germany, has, in a paper contributed to a technical periodical, given the results of experience made with the preservation of railroad ties in Germany, where various systems are very widely used. He has found, in the course of his investigations, that the average life of unimpregnated ties on the German and Austrian railroads has been as follows up to the present time:

	Years.
For oak ties	13.6
For fir ties	7.2
For pine ties	5.1
For beech ties	3.0

The average life of ties impregnated in a rational manner, with creosote or chloride of zinc under a powerful pressure, reaches:

	Years.
For oak ties	19.5
For fir ties	14 to 16
For pine ties	8 to 10
For beech ties	15 to 18

The average life of 831,341 pine ties on 13 German railroads, impregnated on various systems, is calculated at 14.0 years. The plan of simply steeping the ties cold in the impregnated fluid, or warming them or boiling them therein, has been abandoned by most of the roads formerly practicing it, owing to its unsatisfactory results, and the system of impregnating under a strong pressure is being universally adopted. A few roads steep their ties in corrosive sublimate without pressure and are satisfied with the result. The employment of blue vitriol for impregnation is being more and more abandoned in favor of chloride of zinc, because the result is not so satisfactory, which may be owing to the fact that only steeping—or, at most, a weak hydrostatic pressure—is employed for impregnation, and an expensive copper tank is required for the purpose. The material itself is almost four times as expensive as chloride of zinc, while the results of impregnation with the latter and creosote are about equal. But as the impregnation with creosote costs about three times as much as with chloride of zinc, a majority of the German railroads have gone over to the latter.

Niello Work.—This beautiful class of work, which is so much made in Russia, and especially in the Caucasian provinces, is a sort of enameling upon silver with a paste consisting chiefly of the sulphide of the metal itself. The following account of the process is given by Dr. Percy: Take 4 drams of silver, 2 ounces and 4 drams each of copper and salammoniac, 3 ounces and 4 drams of lead, and 12 ounces of flower of sulphur. Make a paste of the flower of sulphur and water; put it into a crucible; afterward melt the metals, and pour them into the crucible which contains the paste; recover this vessel in order that the sulphur may not take fire, then calcine over the fire until all the superfluous sulphur is driven off; afterward finely pulverize the mass, and make, with the addition of a solution of salammoniac, a paste, which introduce, by means of rubbing, into the parts intended to be enameled; then clean the article, and place it in a furnace, where it is sufficiently heated to melt the paste which fills the engraved parts and make it adhere to the metal. That done, moisten the article with a solution of salammoniac, and heat it in a muffle to redness; after which you may rub and polish the article when it has become cold, without fear either of altering or of detaching the enamel; it remains always of a very fine black color.

Iron Ore Exports from Bilbao, Spain.—According to the *Revista Minera*, the exports of iron ore from the port of Bilbao were, during the year 1879, to England and Wales 692,972 tons, Cardiff and Newport being the principal ports, with 299,685 and 219,783 tons, respectively, thus showing that the Welsh iron district is chiefly dependent upon that source for rich, pure ores. Scotland received 42,471 tons, while 121,821 tons entered Rotterdam, probably all in transit for German works. Belgium received only 39,531 tons, while France took 203,621 tons. The shipments to this country footed up to only 17,420 tons, of which 14,393 tons entered New York, 1483 tons Philadelphia, 1338 tons Baltimore, and 201 tons Perth Amboy.

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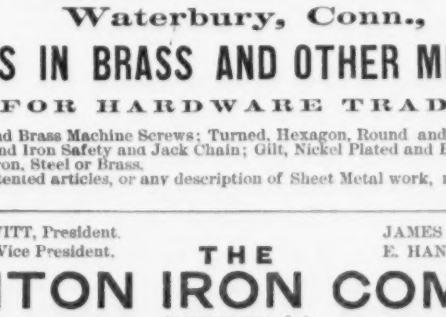

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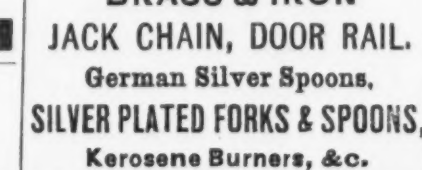
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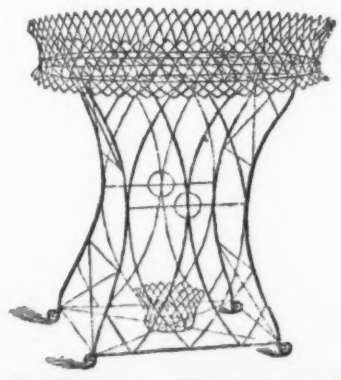

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Boiler Furnaces at the Cincinnati Exposition.

The Commissioners of the Seventh Cincinnati Industrial Exposition offered for competition a premium of $500 for the best smoke burning device to be attached to steam boiler furnaces. Those submitted for test trials were the "Walker," designed by R. L. Walker & Co., of Boston, Mass.; the "Fisher," by Lawrence, Foulds & Fisher, of Cincinnati, O.; the "Eureka," by Douglass, Ladlow & Hart, of Cincinnati; the "Price," by William Price, of Cincinnati, and the "Murphy," by Thos. Murphy, of Detroit, Mich. A series of trials with these furnaces were conducted by John W. Hill, M. E., whose report contains the following data in reference to the performance of the devices tested.

Pittsburgh coal was chosen for the trials for several reasons:

1. The high percentage of volatile matter and facility with which it is distilled from the coal, makes it a difficult combustible to work in furnaces designed for smoke prevention; and a furnace capable of good results in this respect when worked with Pittsburgh coal, can be relied upon to furnish equivalent if not better results with any other coal.

2. Pittsburgh coal contains a higher percentage of combustible and a higher thermal value per unit of weight than any other known coal; and economic results obtained from the use of this coal exhibit the maximum possible efficiency of furnaces under the conditions of trial.

3. Pittsburgh coal is well-known throughout the United States, wherever bituminous coal is used, and the results of these trials can readily be compared with the result of many former trials on furnaces and boilers where coal has been used, the relative value of which has been established.

From the analysis, for the purpose of these trials, by Prof. Bruno Kniffler, chemist, and the known distribution of heat in the trial of the "Murphy" furnace, the thermal value has been taken at 15,500 heat units per pound of combustible. The coal was weighed to all the furnaces, save the "Murphy," in uniform charges of 200 pounds, and dumped in the boiler room ready for use. The coal was weighed to the "Murphy" furnace in uniform charges of 100 pounds. The charges and weights of coal were noted and checked independently by two observers; and no charge was permitted to be removed from the scale until both observers were satisfied as to the weight, and had entered the charge in their note books. At close of each trial, after the fires were restored to their original condition under the direction of Mr. Hill, the unburned coal was weighed back and deducted from the total quantity charged. The fires having been sliced and cleaned before the trials began, all ash and clinker accumulated during the trials was weighed back dry, and deducted from net coal charged, to obtain the weight of combustible in the coal fired. Of the accumulations in the ash pits of the several furnaces, were small quantities of combustible which worked through the grates during the trial, the values of which have been estimated in percentages of net coal charged.

The water delivered to the boilers was carefully measured in a tight tank, divided into two compartments; one compartment contained 1728.5 pounds, and the other 1727.0 pounds, with water at 70° F. The compartments of the measuring tanks were alternately filled from the city mains to the crest of the central partition, and drawn down to the lower edge of the outlet pipe. Uniform volumes of water were delivered by the measuring tank for all of the trials. From either compartment of the measuring tank, the water was drawn into a supplemental tank, connected with the feed to the boiler. The level of water in the supplemental tank being carefully noted at commencement of trial, the same level was made to obtain at the close of trial, and the number of full tanks charged, and the final partial tank held to represent the total delivery of water to the boiler during the trial.

In order to determine the thermal value of the steam furnished by the boilers, a small proportion of the evaporation was drawn through a calorimeter and condensed. The condensation was collected in a tight tin can and periodically weighed. The water expended in condensing the steam was measured into a tight barrel, through a Worthington meter. The water from the barrel entered the calorimeter near the bottom, at a normal temperature, and passed out of the calorimeter near the top, at an elevated temperature. The elevation of temperature being due to the heat transferred from the steam to the water, which was all the heat the steam contained, except the small quantity resident in the condensation as it flowed from the end of the worm. The temperature of the condensing water as it entered and left the calorimeter, and the temperature of the condensation as it left the worm, were read to quarter degrees regularly every fifteen minutes. As the economic and capacity results of the trials largely depended upon the calorimeter data, this portion of the work was placed in charge of an experienced assistant, and his readings were frequently checked to insure accuracy in the observations.

The steam pressure, barometer readings, water heads in the syphon gauge, and temperatures of water from the city mains, of the feed to the boilers, of the air entering the furnaces and of the waste gases in the uptake, were taken regularly every fifteen minutes during the trials. The hygrometer readings for weight of vapor of water in the air entering the furnace were taken every thirty minutes; and the temperature of furnace gases, by calorimeter process, were taken hourly.

The observations of smoke issuing from the chimney were taken by two independent observers alternately, every seven and one-half minutes during the trials, except when the darkness, toward the close of trials prevented an accurate reading of the chimney. In reading the chimney gases the following novel code governed the observers: The entire absense of smoke was taken at 100, indicating the best possible smoke prevention. Faint traces of smoke in the waste gases were taken at 90, indicating results rarely obtained with ordinary furnace construction and the most skillful firing. Discoloration of the waste gases readily perceptible was taken at 75, indicating a state of smoke prevention considerably above the average of ordinary furnace performance. Ordinary smoke issuing from the chimney was taken at 50, indicating a state of smoke prevention slightly above the average of ordinary furnace performance. The ordinary condition of chimney gas, with which Cincinnatians are so familiar, was taken at 30, indicating no smoke prevention at all; and the last stage of dense black smoke was taken at 10. The notations, except for the entire absense of smoke, are nearly inversely as the weights of free carbon in the waste gases issuing from the chimney. The duration of the trials was 10 hours for each furnace.

The following are the data observed, the figures given being a mean of 41 observations

STEAM PRESSURE.

	Lbs.		Lbs.
Walker furnace	38.755	Fisher furnace	80.287
Eureka furnace attachment	76.181	Price furnace	82.100
		Murphy furnace	81.575

TEMPERATURE—FAHR.

	Air.	Water.	Feed.
Walker furnace	100.07	70.025	70.025
Fisher furnace	83.27	71.069	166.012
Eureka furnace attachment	82.21	72.640	169.112
Price furnace	83.40	73.569	176.360
Murphy furnace	80.28	74.550	74.550

TEMPERATURE—FAHR.

	Furnace.	Back connection.	Waste gases.
Walker furnace—incandescent	1931.24	.....	.....
Walker furnace—green	1486.68	.....	541.29
Fisher furnace	1902.94	665.12	542.28
Eureka furnace attachment	2369.30	1043.15	468.30
Price furnace—incandescent	3053.00	1587.92	421.05
Furnace—green	2491.07	.....	.....
Murphy furnace	3056.75	812.35	279.67

CALORIMETER.—Fahr.

	Condensg. water.	Condensation.	Overflow.
Walker Furnace	74.09	85.43	87.66
Fisher Furnace	73 91	83.40	86 14
Eureka Fur. Attachment	73.43	79.02	81.42
Prics Furnace	76.40	85.71	97.22
Murphy Furnace	74 37	77.08	114.96

THERMAL UNITS PER POUND CONDENSING WATER.

Walker Furnace	13.57	Fisher Furnace	12.20
Eureka Furnace Attachment	7.99	Price Furnace	20.82
		Murphy Furnace	40.59

Column I, in the following table, gives, in pounds, the weights of condensing water; column II, weights of steam condensed; and column III, the ratio of water to steam:

	I.	II.	III.
Walker Furnace	3,282.75	51.00	64.483
Fisher Furnace	10,041.53	139.00	72.240
Eureka Fur. Attach't.	6,633 61	57.18	116.012
Price Furnace	6,362.82	93.25	68.233
Murphy Furnace	5,564.70	165.56	33.611

The heat in the steam was found to be:

Walker Furnace, hours	5.50
(13.57×64.483)+85.43	960.46
Fisher Furnace, hours	10 00
(12.20×72.240)+83.40	964.73
Eureka Furnace Attachment, hours	8 00
(7.99×116.012)+79.00	1005.93
Price Furnace, hours	6.45
(20.82×68.233)+85.71	1506.32
Murphy Furnace, hours	9.50
(40.59×33.611)+77.08	1441.35

The quantity of air used per pound of steam was:

	Lbs.		Lbs.
Walker Furnace	34.5647	Fisher Furnace	34.7898
Eureka furnace attachment	27.4754	Price Furnace	20.9310
		Murphy Furnace	20.8501

The weight of the vapor of water in the air supporting combustion is stated in decimals of a pound, per pound of air supplied, in the following table. The total quantities of coal in pounds are shown in column I; ash, clinker and combustible returned, in column II; percentage of combustible, in column III, and combustible in ash, percentage of coal, in column IV.

	I.	II.	III.	IV
Walker Furnace	.02314	3802	202.90	94.685	2.273
Fisher Furnace	.01550	1866	87.50	95.365	1.593
Eureka Furnace attachment	.01485	3120	113.03	96.692	0.362
Price Furnace	.01767	2934	112.03	95.532	1.376
Murphy Furnace	.01612	774	28.75	96.326	0.652

The water delivered to the boilers was:

	Lbs.		Lbs.
Walker furnace	28859.00	Fisher furnace	10896.00
Eureka furnace attach.	33458.77	Price furnace	23282.92
—325	33133.77	Murphy furnace	6854.50

The results of the trials prove accordingly:

SMOKE PREVENTION.

		Readings	Rel. val.
Walker	Mean of 79	86.923	88.275
Fisher	" 81	80.125	81.372
Eureka	" 80	86.140	87.480
Price	" 80	81.202	82.465
Murphy	" 77	98.467	100.000

The evaporation of steam per pound of coal from temperature of feed-apparent was:

	Lbs.		Lbs.
Walker	7.5945	Price	8.6425
Fisher	5.8391	Murphy	8.7918
Eureka	9.6881		

The steam generated per pound of coal from and at 212° amounted to:

	Lbs.		Lbs.
Walker	7.0003	Price	11.8979
Fisher	4.8280	Murphy	12.450
Eureka	8.3926		

The evaporation by the Eureka furnace attachment should be diminished by the amount of steam expended in maintaining the jets. The orifices in the nozzle are .0625-inch diameter, and aggregate area of orifice in the eight nozzles

$$8 \times \frac{.0625^2 \times .7854}{144} = .00017 \text{ sup. feet.}$$

Considering the form of the nozzle and the partial throttling of steam in the supply pipe, it is probable that the velocity of flow referred to full area of orifice was about 1000 feet per second, from which is deduced the weight of steam expended per hour in working the device, as = 131.33 pounds, and percentage of steam absorbed by the device, = 3.963. The effective evaporation from and at 212 becomes = 8.0599 pounds. From these data it will be seen that the relative evaporation was:

Walker	56.227	Price	95.570
Fisher	38.779	Murphy	100.000
Eureka	64.739		

The relative capacity of the various furnaces and boilers proved to be:

Walker	70.877	Price	130.010
Fisher	49.472	Murphy	75.754
Eureka	80.411		

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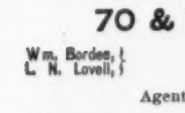
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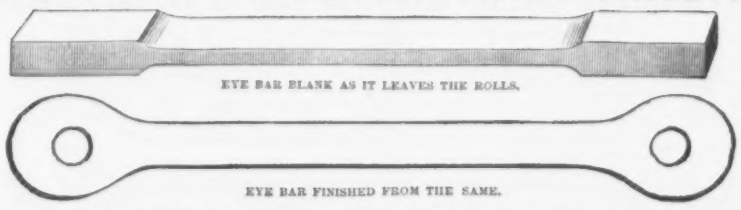
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The relative coal consumption was:

Walker	94.128	Price	84.023
Fisher	78.693	Murphy	52.063
Eureka	100.000		

DISTRIBUTION OF HEAT.

Omitting the capacity of boiler in steam per superficial foot of heating surface per hour, and coal consumption in coal burned per superficial foot of grate per hour, then the best test of absolute and relative merit is the manner in which the heat of combustion was utilized by the several furnaces.

Specimen lumps of the coal fired from during the trials were submitted to Prof. Kniffler for analysis, with the following results:

COMPOSITION OF COAL.

	Per cent.		Per cent.
Fixed carbon	61.038	Ash	3.042
Volatile matter	32.750		
Sulphur	0.863	Total	100.000
Moisture	2.307		

The thermal value of the combustible per pound is probably 15,500 units—equivalent to an evaporation from and at 212° F. of 16.045 pounds—from which is deduced the distribution of heat for the several furnaces (in thermal units) in steam from and at 212° F., and in percentage of total heat in combustible, as follows:

WALKER FURNACE.

	Thermal units.	Steam.	Per cent.
Steam	7141.838	7.393	46.076
Chimney gas	3734.651	3.866	24.095
Vapor of water in air	169.516	0.175	1.093
Moisture in coal	30.129	0.031	0.194
Combustible gas	775.020	0.802	5.000
Radiation	3648.866	3.778	23.542
Total	15500.000	16.045	100.000

FISHER FURNACE.

	Thermal units.	Steam.	Per cent.
Steam	4886.411	5.058	31.525
Chimney gas	7710.455	7.982	49.744
Vapor of water in air	238.775	0.247	1.540
Moisture in coal	30.330	0.031	0.196
Combustible gas	1085.000	1.123	7.000
Radiation	1549.029	1.604	9.995
Total	15500.000	16.045	100 000

EUREKA FURNACE ATTACHMENT.

	Thermal units.	Steam.	Per cent.
Steam	8384.555	8.679	54.094
Chimney gas	2616.616	2.709	16.881
Vapor of water in air	75.697	0.078	0.488
Moisture in coal	29.092	0.030	0.187
Combustible gas	620.000	0.642	4.000
Radiation	3774.040	3.907	24.350
Totals	15500.000	16.045	100.000

PRICE FURNACE.

	Thermal units.	Steam.	Per cent.
Steam	12025.690	12.449	77.583
Chimney gas	1772.842	1.835	11.437
Vapor of water in air	60.390	0.062	0.389
Moisture in coal	28.874	0.030	0.186
Combustible gas	387.500	0.401	2.500
Radiation	1224.704	1.268	7.905
Totals	15500.000	16.045	100.000

MURPHY FURNACE.

	Thermal units.	Steam.	Per cent.
Steam	12487.920	12.928	80.567
Chimney gas	1033.118	1.069	6.665
Vapor of water in air	32.103	0.033	0.207
Moisture in coal	27.086	0.028	0.174
Combustible gas	387.500	0.401	2.500
Radiation	1532.273	1.586	9.887
Totals	15500.000	16.045	100.000

The cost of the several furnaces above that of an ordinary furnace for steam boiler use, is not great, excepting with the Murphy; and even this furnace is not so expensive as to operate against its general introduction. The Eureka furnace attachment is the least expensive of the several systems submitted for trial. The Fisher system of construction adds very little to the cost of an ordinary furnace; and the added cost of the Price and Walker furnaces is not a serious item. The Murphy is the most expensive of all the furnaces tried, and the added cost of this system for a single boiler, according to the agent's statement, is about $75. All the other furnaces cost much less than the Murphy.

The cost of maintenance with furnaces equally well built, and with equal skill and care in their manipulation, will vary about as the cost of application, excepting the Price furnace, where the higher temperature to which the brickwork is subjected will make the cost of maintenance nearly equal to that of the Murphy.

The Fisher furnace adds nothing to the labor of working. The manipulation of the flow of steam to the nozzles of the Eureka attachment requires some skill to avoid a serious waste of steam; and the manipulation of the fires and working of the dampers in the Price and Walker, demands somewhat more labor and attention of the operator than with ordinary furnaces for steam boiler use. The Murphy furnace requires considerable care upon the part of the operator to avoid injury to the furnace, and to produce results similar to those herewith submitted; at the same time no greater skill is required with this system than should obtain in every case with ordinary furnaces; and the reduced labor in charging the coal on the grate, together with the greater personal convenience in working the fires, should compensate for the increased attention demanded of the operator.

The question of durability can only be determined by constant use for a reasonable length of time.

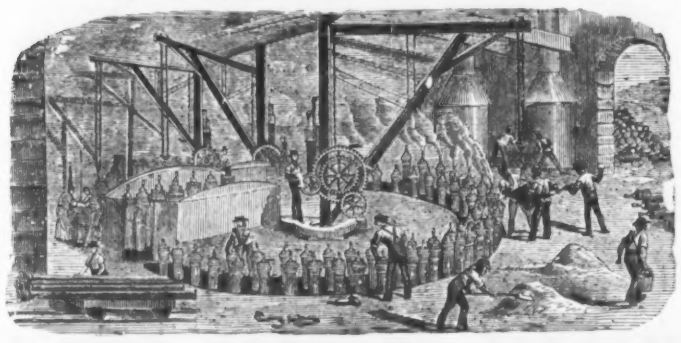
The Eureka attachment will probably wear as well as the furnace to which it is attached. The Fisher and Walker furnaces present no condition prejudicial to their durability. The Price and Murphy furnaces, by reason of the high temperature of fire, will not wear as well as an ordinary furnace equally well built and worked at usual temperature of fire—2000–2500° F.

A Huge Anvil at Motherwell.—The Glasgow *Mercantile Advertiser* of May 11th says: On Friday morning last, operations were commenced at the Dalzell new steel works (Mr. Colvill's) for casting the huge anvil which is to be placed below the steam hammer in the new steel works. The weight of the block is 140 tons, being the heaviest at present in Scotland. The cupola, which is a temporary erection, melted about 10 tons of metal per hour. A good deal of interest was taken in the operations, and a large number of persons visited the place during the day. The work was satisfactorily finished about 9 o'clock the same evening. The contractor was Mr. J. Ireland, Manchester.

A. H. McNEAL & BRO.,

BURLINGTON, N. J.

Flange Pipes.



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FOR WATER AND GAS.

ESTABLISHED IN 1848.

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MANUFACTURERS OF ALL KINDS OF

HAMMERED AND ROLLED

STEEL,

Warranted Equal to any Produced.

BEST REFINED TOOL CAST STEEL

For Edge and Turning Tools, Taps, Dies, Drills, Punches, Shear-Knives, Cold-Chisels and Machinists' Tools generally.

SAW PLATES

For Circular, Mulay, Mill, Gang, Drag, Pit and Cross-Cut Saws.

Sheet Steel

For Springs, Billet Web and Hand Saws, Shovels, Cotton Gin Saws, Stamping Cold, &c., &c.

SIEMENS-MARTIN (Open-Hearth) PLATE STEEL

For Boilers, Fire-Boxes, Smoke Stacks, Tanks, &c.

☞ All our Plate and Sheet Steel being rolled by a Patented Improvement is unequaled for surface finish and exactness of gauge.

ROUND MACHINERY CAST STEEL

For Shafting, Spindles, Rollers, &c., &c.

File, Fork, Hoe, Rake, R. R. Frog, Toe-Calk, Sleigh-Shoe and Tire Steel, &c.; Cast and German Spring and Plow Steel.

"Iron Center" Cast Plow Steel.
"Soft Steel Center" Cast Plow Steel.
"Solid Soft Center" Cast Plow Steel.

Finished Rolling Plow Coulters with Patent Screw Hubs attached.
Agricultural Steel cut to any pattern desired.

Steel Forgings made to order.

Represented at 59 BEEKMAN ST., NEW YORK, by

HOGAN & BURROWS, Gen'l Agents for Eastern and New England States.

MIDVALE STEEL WORKS,

CRUCIBLE AND OPEN HEARTH STEEL.

TIRES AND AXLES

OF EVERY DESCRIPTION.

TOOL, MACHINERY AND SPRING STEEL CASTINGS AND FORGINGS.

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WAREHOUSE: 12 N. 5th St., Philadelphia, Pa.

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PHILADELPHIA,

CHILLED RAILROAD WHEELS

For every kind of service, including *Street, Mine and Lumber Tramways.* Wheels furnished in rough bored or on axles. Chilled castings made to order.

PENNSYLVANIA STEEL COMPANY,

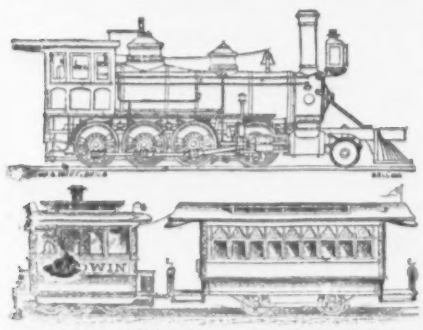
Steel Rails, Frogs, Crossings & Switches.

Forgings for Piston Rods, Guide Bars, Wrist Pins and Machinery Purposes.

Works at Baldwin Station, Pennsylvania Railroad, near Harrisburg, Pa.

Address all orders to

PENNSYLVANIA STEEL COMPANY, 208 South Fourth Street, Philadelphia.



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BURNHAM, PARRY, WILLIAMS & CO., Proprietors,

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LOCOMOTIVE ENGINES

of every Description.

Catalogues, photographs and estimates furnished on application of customers.

NOISELESS STEAM MOTORS,

For city and suburban Railways.

These machines are nearly noiseless in operation; show no smoke with the use of anthracite coal or coke as fuel, and show no steam whatever under ordinary conditions of service. They can be run at two or three times the speed of horse cars and draw additional cars. Circulars with full particulars supplied.

CHROME STEEL

WAREHOUSE.

Address JOHN W. QUINCY, Manager, 98 William St., N. Y.

This Steel is made from Chromium and Iron, and is remarkable for Strength, Durability and Uniformity. Send for Circular, where the proof will show it does 25 to 75 per cent. more than other cast steel. It is adapted to all kinds of work where cast steel is used. Chrome Steel Castings from 25 to 500 lbs. to order.

Southern Advertisements.

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Manufacturers of and Dealers in

Pig and Railroad Iron.

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S. B. LOWE, Chattanooga, Tenn.,

DEALER IN

PIG IRON, IRON ORES AND FURNACE COKE

LIGHT GRAY IRON CASTINGS

MADE A SPECIALTY BY

TAYLOR & BOGGIS,

65 to 73 Central Way,

CLEVELAND, OHIO.

Having extensive machine shop connected with foundry, we are enabled to fit up all kinds of light Hardware or patented articles. Correspondence solicited.

RICHARD P. PIM, Wilmington, Delaware,

MANUFACTURER OF

REFINED AIR FURNACE MALLEABLE IRON,

IMPROVED PROCESS,

And LIGHT GRAY IRON CASTINGS.

Castings of Best Quality made to order at short notice.

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MANUFACTURERS OF

BOILER, TANK AND BRIDGE PLATES,

Galvanized and Black Sheet Iron.

Foot of Wasson Street, CLEVELAND, OHIO.

JACKSON IRON COMPANY,

Manufacturers of
Fayette Pig Iron (L. S. Charcoal),
Stewart Pig Iron (Bituminous Coal and Coke),
Also, Hammered Blooms, Billets and Muck Bar, extra low in phosphorus, for Siemens Martin and Crucible Steel. Miners of Jackson (Lake Superior) Iron Ores.

} Especially adapted for Bessemer, Siemens-Martin Malleable and Car Wheel purposes.

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HARVEY H. BROWN & CO.,

AGENTS

CHAMPION IRON CO.,
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Dealers in Pig Iron, Iron Ores and Old Rails.

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C. E. BINGHAM & CO.,

Agents for the Sale of

Lake Champlain, Lake Superior and Canada Iron Ores and Pig Iron,

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LIGHT GRAY IRON CASTINGS

E. K. Chamberlin,

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I am prepared to make and fit up all kinds of

LIGHT CASTINGS.

SIDEWALK LIGHTS.

Est. in 1840 by JOHN ROACH.

ÆTNA IRON CO., WM. J. FRYER, Jr Manager.

Manufacturers of every description of Wrought and Cast

ARCHITECTURAL IRON WORK FOR BUILDINGS.

86 to 108 Goerck Street, New York.

WROUGHT IRON.

Roofs. Stairs. Floors. Shutters and Doors, with various fastenings. Rolling Shutters. Window Sashes and Frames. Fire-Proof Ceilings and Partitions. Lathing. Sky-Lights. Floor-Lights. Book-Safe Doors. Fire-Escape Balconies and Ladders. Rolled and Riveted Beams and Girders. Bank-Vault Doors & Safes. Bridles, Truss Plates and Bolts, for Wood Beams. Anchors, Clamps and Ties for mason work. Framing, for Slate. Gratings, for Areas. Corrugated Sheet Iron galvanized or plain. Window Panels & Guards. Water Tanks. Platform Elevators for Stores. Etc., Etc., Etc.

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Fronts for Buildings. Columns of every kind. Arch Girders, with tension rods—improved shape. Cast Iron Beams. Cornices. Capitals and Bases. Fine Rings. Ventilators. Illuminating Tiles, for Steps and Platforms. Roof Crestings & Finials. Verandahs. Balconies. Shutter Eyes. Turn-Buckles. Window Lintels and Sills. Lamp Posts. Tree Boxes. Chimney Caps. Coping. Leader Pipes. Gutter Spouts. Coal Covers. Walking Plates. Railings and Gates, for dwellings, offices and cemeteries. Improved Chairs, for theatres, with turn-up seats. Stable Fixtures, Mangers Stall Guards, &c.

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Cross Creek Lehigh Coal.

The Purity and Strength of this Coal especially adapt it for the working of Iron and Metals.

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MONTPELIER, VT., MANUFACTURERS OF

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SABIN'S LEVER DOOR SPRINGS, For heavy doors,

BOSS AND CROWN SPRINGS, For light doors.

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Near First, BROOKLYN, E. D.

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SOMORROSTRO MINES.

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15 DEY ST., New York.

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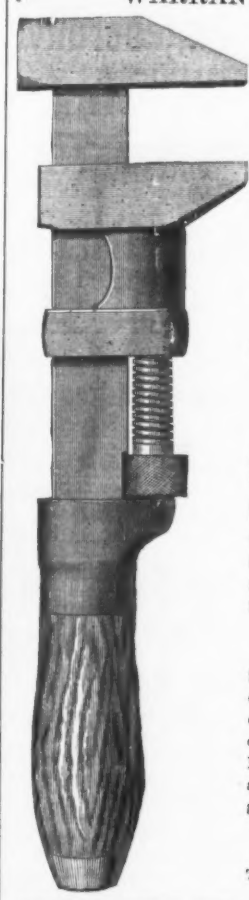

FOR **STRENGTH** AND **Durability** IT HAS NO SUPERIOR.

GUARANTEED IN EVERY RESPECT.

Wrought Bar, Head and Screw.

Owing to the *increased demand* for these justly Popular Wrenches, we are now manufacturing more than any other establishment in the world.

Our Wrench having been imitated by other manufacturers, we have adopted the above Trade Mark, and will hereafter stamp all our goods.

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A. GARRISON & CO.,

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Both Solid and Hollow,

Ore and Clay Pulverizers, Rotary Squeezers, Haskin's Patent Double Spiral Pinions, and **Rolling Mill Castings of every description.**

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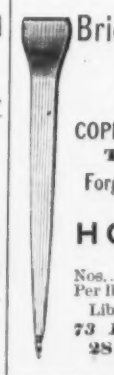

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Bridgewater, Mass.,

Manufacturers of

SEAMLESS DRAWN

COPPER AND BRASS TUBES,

TACK PLATES,

Forgings of every description.

Bridgewater Iron Co.'s

HORSE NAILS.

PRICE LIST.

Nos.	5	6	7	8	9	10
Per lb.	20¢	23¢	21¢	20¢	19¢	18¢

Liberal discounts to the Trade.

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The Iron-Masters' LABORATORY.

Exclusively for the

Analysis of Ores of Iron, Pig and Manufactured Iron, Steels, Limestone, Clays, Slags and Coal for Practical Metallurgical Purposes.

No. 339 Walnut St., Philadelphia.

J. BLODGET BRITTON.

This laboratory was established in 1866, at the instance of a number of practical Iron Masters, expressly to afford prompt and reliable information upon the chemical composition of the substances above mentioned, for smelting and refining purposes. The object being to make it at once a convenient, practically useful, and comparatively inexpensive adjunct to the Furnace, Forge and Rolling Mill.

CHARGES TO IRON WORKS.

For determining the per cent. of Pure Iron in an ordinary Ore	$4.00
For the per cent. of Pure Iron, Sulphur and Phosphorus in do	12.50
For each additional constituent of usual occurrence	1.50
For those of unusual occurrence or difficult to determine, the charge must necessarily depend upon circumstances.	
For determining the per cent. of Sulphur or Phosphorus in Iron or Steel	7.00
For each additional constituent of usual occurrence	5.00
For the per cent. of Carbonate of Lime, and insoluble Silicious Matter in a Limestone	10.00
or each additional constituent	2.00
or the per cent. of Water, Volatile Combustible Matter, fixed Carbon, and Ash in Coal	12.50

For determining the constituents of a Clay, Slag, Coke, or of an Ash in Coal the charges will correspond with those for the constituents of an ore.

For a written opinion or letter of instruction the charge must necessarily depend upon circumstances.

Printed instructions for obtaining proper average samples for analysis furnished upon application

Iron and Stoves.

The Metal Worker says: In our recent editorial remarks on the outlook for the stove trade, we omitted one point which should be better understood by dealers than it is—namely, the comparatively small effect of fluctuations in iron upon the cost of stoves. When the dealer learns that iron has declined from $40 to $30, for example, he commonly concludes that the cost of stoves has declined 25 per cent., and that his stock, if he has any, has depreciated in actual value by that amount. For this impression the manufacturers are in some degree to blame, for in their announcement of advances last winter they laid particular and unnecessary stress upon the advance in iron. This saved trouble, for the dealer could understand it, and would not be apt to inquire too curiously concerning the percentage added to the selling prices of stoves at wholesale, when fully impressed with the fact that iron had advanced 100 per cent., more or less. This was all right at the time, but for the same reason that he was satisfied then, he expects now to get the benefit of the subsequent decline in iron to the extent of that decline. But he cannot, and there is a good reason for this which he should understand. It will correct many mistakes to have it explained to him.

In another column we print an article on estimating the cost of stoves, which is intended for the information of manufacturers, but the dealers would do well to read it. From this they will see that iron is not by any means the most important of the items entering into the cost of stoves. What stoves cost to make is something about which no two manufacturers are ever quite agreed, but we are not far out of the way in saying that the present average cost of making and selling stoves is $120 per ton. Pig iron at foundries will average at least $30 per ton, and any dealer can see that the cost of a ton of iron, in the form of stoves, is only about one-quarter of the cost of the ton of stoves made and sold. The share of the total cost which belongs to the several groups of items may, by a rough classification, be stated as follows:

Iron, coal, sand and facings	$0.35
Labor, including clerks and travelers	.50
Sundries	.35
Total	$1.20

Subdividing the first item we can charge iron with only $30, leaving $5 for coal, sand and facings.

In estimating the influence of fluctuations in iron on the price of articles made therefrom, we must first know what proportion the value of the iron bears to the labor and other elements of cost. In the case of watch springs, to take an extreme example, the price would not be affected by fluctuations in iron between wider limits than were ever known. As compared with the labor, the value of the iron converted into steel and formed into the springs, is as nothing. In the case of nails, on the other hand, the cost of the iron may be three-quarters of the value of the finished product. In stoves, as we have seen, it is only about one-quarter, and, while it fluctuates somewhat, the items aggregating the other three-quarters of cost are measurably constant.

With regard to iron, we can say that the outlook in this market is decidedly better and prices are unquestionably stiffening. When the fall demand is felt we expect a considerable advance, with a good feeling throughout the trade. Concerning the stove business, we are even more confident than we were two weeks ago, that there are no present grounds for uneasiness or apprehension. With good business and a fair foreign demand for our surplus agricultural products, there will be nothing to fear. The working classes are employed, the prosperous condition of the South is a new and important factor in the business situation, the immigration is enormous, and a vast area of new territory has been developed and is rapidly filling up with settlers. These are all favoring conditions. On the other hand, the supply of stoves is not great in proportion to the demand. Early in the year many foundries were run light for want of iron, and it is not improbable that before cold weather the demand for stoves will be greater than the foundries are able to meet. These are matters of opinion only, but we are happy to say that present indications warrant the confident views we have expressed.

The Coming Industrial Art Exhibition in Philadelphia.

The trustees of the Pennsylvania Museum and School of Industrial Art propose to give an exhibition at Memorial Hall, next September, of peculiar interest and importance. They want to make a display which will show what is being done in our mills and workshops, and which will illustrate the great advances of late years in the application of art to industry. In finding examples of this, we think they will have little trouble. Art work within the past five or six years has taken a strong hold upon our people, and manufacturers are beginning to find that a small amount of beauty added to the most ordinary of their products makes a very satisfactory return in the shape of profits. It is only within a comparatively recent period that the combination of usefulness and beauty has received any systematic attention. According to the old idea, art is one thing and industry another, and the two have nothing in common. A hard and fast line used to be drawn between the useful and the ornamental. An article might be the one or it might be the other, but it was neither desired nor expected to be both. Our practical ancestors were even prejudiced against pretty things. They had a vague idea that beauty excluded utility, and they had no notion that the province of art extended beyond the production of pictures or of *bric-à-brac*.

A writer says, in a recent newspaper article, that "what is now known as industrial art is entirely of modern creation. The French were the first to perceive that Art might be made the handmaid of Industry, and that the long-existing divorce between the two was induced by misapprehension." This is a great mistake, for it is only in modern times that the divorce between Art and Industry took place. In the Middle Ages the workman was an artist as well as a workman. He had what it is almost impossible to find at the present day, even in cultivated society—a real love of nature and of the beautiful. Our art schools of the present day are doing wonders in the way of teaching; they are making workmen who are skilled in producing beautiful forms and are improving our manufactures to an almost unhoped-for extent. The unfortunate feature, however, is the fact that they are making art fashionable. They make it "the rage"—the "correct thing"—but they seem powerless to spread a real love of art and nature. Until workmen have a strong feeling of love for beautiful things, instead of simple admiration or pleasure in them, we cannot expect the wonderful results which came from the hands of the mechanics of 500 years ago.

Among modern nations the French were the first to realize that there is no inherent incompatibility between beauty and utility, and they set themselves at work to combine the two. A liberal and prescient government founded schools of design, and fostered in every way the artistic talent of the people. Such enterprise and intelligence had their reward. When the first great international exhibition was held, in 1851, the French were ahead in all the great branches of industry in which design can be made to play a part. The English were disagreeably surprised. They could not help noticing the superior attractiveness of the French products. It was borne in upon them that ground had been lost which would have to be made up, and no sooner had the exhibition closed than the establishment of art schools upon the French system was begun. What the exhibition of 1851 did for the English the Centennial Exhibition did for us in one sense. It gave the people an idea of the great value of art, and of the need in which the country stood for a system of art education. A great impulse has been given by the Centennial Exhibition to all our schools of art, and many new schools have been established which are doing good work in the education of the rising generation of producers and consumers. A great stride has been made during the four years which have elapsed since the opening of the Centennial, and the suggestion which is now put forward that this advance be illustrated by an appropriate exhibition is a very excellent one. There ought to be no difficulty in carrying it out. Nothing more is needed than the hearty co-operation of the manufacturers of Philadelphia, and that this will be forthcoming there is no reason to doubt. The scheme is one which should have something more than a local patronage. Anything which tends to advance the interests of industrial art is of universal interest. Although the exhibition, as we understand, is to be under the patronage of the Philadelphia School of Art, yet it should have the most hearty sympathy and co operation of manufacturers in all parts of the country. Aid, both moral and financial, should be forthcoming if it is needed.

"Death In the Frying Pan."

Last week we published an article upon the subject of lead-coated frying pans, which had the heading of "Death in the Frying Pan." In it we gave a discussion which had taken place in Dublin, in regard to several cases of sickness that had resulted from eating food prepared in frying pans coated with lead instead of tin. An English firm have written a letter upon the subject, which appears in a late number of the *Ironmonger*. It is as follows:

SIR: In your issue of March 24 we notice an article under this head. We beg to inform you that frying-pan makers do not wish to produce the common article which has been made as now for a century, but it is the constant cry of the market for a cheap article, consequently makers are compelled to meet the public wish. About thee years ago we introduced a pure tinned frying pan, which we guarantee without the slightest mixture, and other makers have since produced a similar article. They can be procured through all respectable merchants and factors, and, if not objected to, stamped with our trade-mark on the handle. Of course they are a little dearer, but the extra cost is not much compared with the increased value secured. It is now consumers' own fault if they do not obtain a pure and superior frying pan.

We are, dear sir, yours very truly,
RALPH & JORDAN.

A word about frying pans, and the materials for them, may not be out of place here. If a pan is to be used for frying, tin is not a suitable metal for a protecting coating, because its melting point is below that at which the ordinary fats used in cooking boil. Lard, for example, boils at a temperature of some 160 degrees higher than the melting point of tin. As good and wholesome frying cannot be done unless the lard is nearly up to the boiling point, it is easily seen that tin is not a proper metal for the purpose, on account of the easy destruction of the coating by the necessary heat.—*The Metal Worker.*

A London correspondent describes an interesting chart of the iron trade now in course of preparation. It shows since 1830 the prices of various descriptions of pig and manufactured iron, and it appears that the total amount of pig iron turned out by British furnaces in 1830 was about one-tenth the amount manufactured in 1872, and that last year, despite the bad state of trade, the output was only about 500,000 tons less than in 1872, except during the years of the Crimean War and the American Civil War. The exports have since 1830 increased annually almost without a break from 117,135 tons, until the year 1872, when the total exports were 3,382,762 tons—an enormous difference. Since then, however, the quantity has fallen off till in 1879 it amounted to only 2,224,470 tons, since which time it has again increased, and last year amounted to 2,879,834 tons.

A German chemist announces that cotton clothing can be made practically uninflammable by the simple addition of a teaspoonful of borax to each pint of starch, after the latter has been made ready for use.

AUBURN FILE WORKS,

Superior Hand-Cut

FILES AND RASPS,

MADE FROM IMPORTED STEEL. EVERY FILE WARRANTED.

FULLER BROS., Sole Agents,

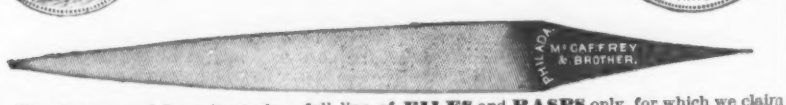
39 Chambers and 71 Reade Streets, N. Y

Paris, 1878. *For Superiority.*

McCAFFREY & BRO.,

PENNSYLVANIA FILE WORKS,

Philadelphia, Pa., U. S.



Manufacture and keep in stock a full line of **FILES** and **RASPS** only, for which we claim special advantages over the ordinary goods, and ask domestic and foreign buyers to allow us to compete for their trade.

Superiority acknowledged wherever used, sold or exhibited.

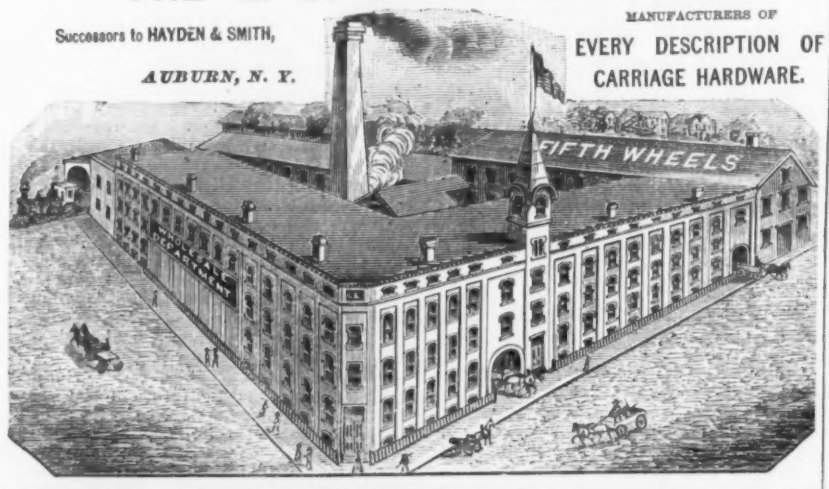
THE E. D. CLAPP MFG. CO.,

Successors to HAYDEN & SMITH,

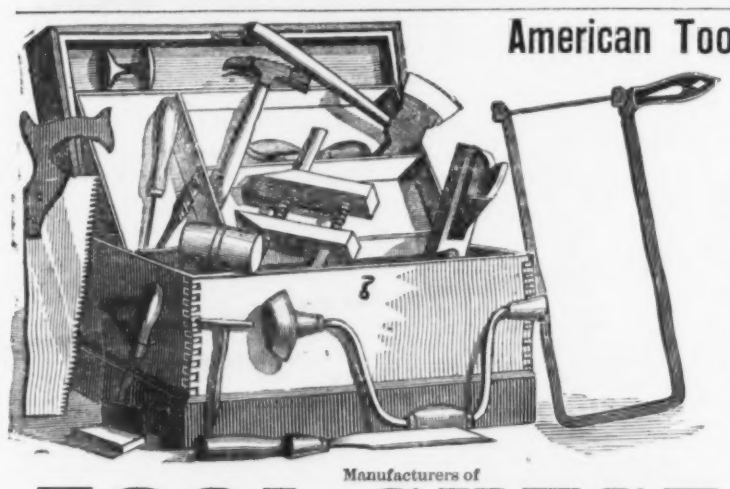
AUBURN, N. Y.

MANUFACTURERS OF

EVERY DESCRIPTION OF CARRIAGE HARDWARE.



American Tool Co.,



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Warehouse & Salesroom,

Manufacturers of

TOOL CHESTS

OF EVERY DESCRIPTION.

Fitted up with a superior quality of Tools, and adapted for the home and export trade. Illustrated descriptive catalogue furnished on application. Mechanics' Tools and Hardware specialties.

RIPLEY MANUFACTURING CO.,

Unionville, Conn., U. S. A.

BEST PORCELAIN-LINED LEMON SQUEEZERS.

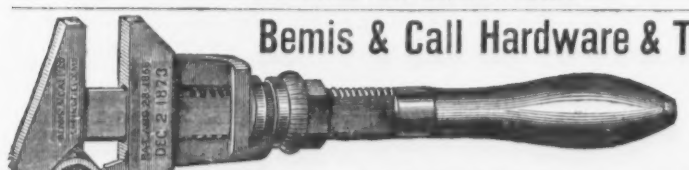
"Common Sense" Mouse Traps.

HAND-MADE ROSEWOOD FAUCETS.

Housefurnishing Hardware.

FOR HOME AND EXPORT TRADE.

Bemis & Call Hardware & Tool Co.



This Wrench can be furnished with Briggs' Pat. Nut or Sleeve.

PATENT COMBINATION WRENCH.

These Wrenches are made from the best of Wrought Iron, with Steel Head and Jaw, case-hardened throughout, and not only combine all of the superior qualities of our Cylinder or Gas Pipe Wrenches, but also all requisite Combinations of a regular Nut Wrench, thus making a combination which has no equal

For Circulars and Price List, address

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SANDS' TRIPLE MOTION WHITE MOUNTAIN ICE CREAM FREEZERS.

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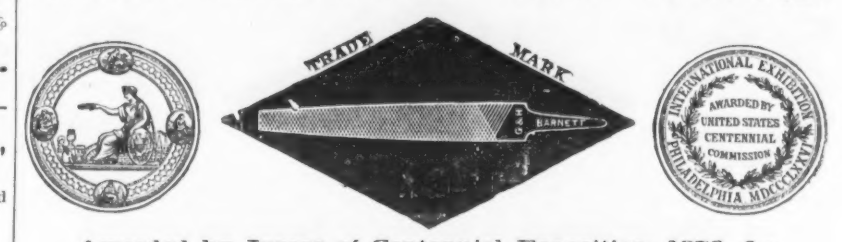

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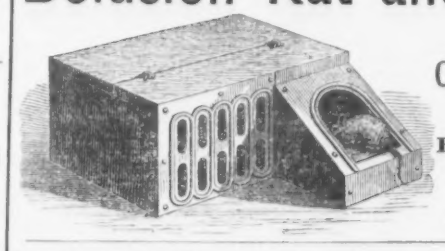

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Annual Meeting of the British Iron and Steel Institute.

Mr. Henry Simon, of Manchester, read a paper on

THE CARVES SYSTEM FOR UTILIZING THE BY-PRODUCTS IN THE MANUFACTURE OF COKE.

This system, to which we have already referred, appears to have been in continuous operation at the Bessèges works of the Terrenoire Company, France, since the year 1867, when 25 coke ovens were erected. The results there obtained are clearly set forth in the following table :

	1878.	1879.
Coal consumed, in metric tons	41,797	46,900
Number of coke	78	96
Coke produced, in tons	29,166	33,092
Production of coke per oven per year, in tons	355	344
Tar obtained, in tons	851	1,099
Ammoniacal liquor obtained, in tons	3,995	4,393
Sulphate of ammonia made, in tons	122	.....
Yield of coke according to books, per cent.	69.8	70.5
Yield of coke after deduction of water contained in washed coal, per cent.	74.2	75.0
Tar per metric ton of coal, in lbs.	45.0	51.6
Tar per ton of coke, in lbs.	64.4	73.2
Ammoniacal liquor per ton of coal, in lbs.	210.8	206.3
Ammoniacal liquor per ton of coke, in lbs.	302.0	291.3
Small fuel consumed under grates per ton of coke made, in lbs.	33.5	35.0

According to the Carvès system, the coal is rapidly carbonized by subjecting a comparatively thin layer of it to a high temperature in a closed and retort-like vessel, and while in the beehive ovens the volatile products are burned inside, they are in this case burned around the outside of this retort-like vessel, and only after they are deprived of the tar and ammoniacal liquor. Each oven is in the form of a long, high, narrow chamber of brickwork, and a number of these are built side by side, with partition walls between them sufficiently thick to contain horizontal flues. Flues are also formed under the floor of each oven, and at one end of these is a small fire-place, consisting of a fire-grate and ashpit with suitable door, the fire door having fitted above it a nozzle, through which gas produced from the coking is admitted, to form a flame over some fuel burning on the grate. Only a very trifling amount of such fuel, consisting exclusively of the small refuse coke, is used here, its function being really more that of igniting the gas than that of giving off heat. These grates are not charged with fuel more than twice every 24 hours when in regular work. The products of combustion pass from the fire-place along a flue under the oven floor to the end furthest from the fire. They return along another flue under the floor to the fire end ; they then ascend by a flue in the partition wall to the uppermost of several horizontal flues formed therein, and descend in a zigzag direction along these flues, finally passing into a horizontal channel leading to a chimney. Thus the coke oven is heated at the bottom in the usual manner, but also evenly at the sides, and the coal with which it is charged becomes rapidly and completely coked. No air is allowed to enter the ovens, which, in reality, are closed vessels, with the exception of the openings for the escape of the volatile products. The improved ovens are fed with coal by openings in the roof, over which coal trucks are run on rails ; and the coal is evenly distributed by rakes introduced at end openings provided with doors, faced with refractory material, which doors are closed and kept tightly luted while the oven is in operation. The feed holes in the roof are also provided with covers. Through the middle of the roof rises a gas pipe provided with a hydraulic valve, which closes the passage by a lip projecting down from it into an annular cavity surrounding its seating, in which it is immersed in a quantity of tar and ammoniacal liquor lodged there during previous distillations. The volatile products of the coal distillation rise by the gas pipe, and are led through a range of pipes kept cool by external wetting, so that the tar and ammoniacal liquor become condensed and separated from the combustible gas. When a charge is nearly finished and ready to be taken from the oven, some trucks full of coal are placed ready on the rails going right along on the top of the ovens and over the charging holes. The two end doors are then opened. The mass of coke, measuring about 30 feet long by 2 feet thick and 6 feet high, is pushed out at the back of the oven and on to the bank by means of a ram or piston, worked by a portable steam engine running on rails in front, and similar to the well-known arrangement used with the Copée ovens. The ram can be brought opposite to each oven in turn. The coke is then quenched as usual. Experience has shown that a great deal depends upon the dimensions of the vertical section of the ovens to insure the proper quality of coke. At the outset they were made too wide and too low, so that the width has been gradually decreased from 6 feet 6 inches to 2 feet, and the hight has become at least 6 to 7 feet. M. Jouguet, of Bessèges, has made experiments to show how the size of the ovens affects the hardness of coke, or its resistance to crushing strain per square inch, with the following results, in pounds :

Carvès oven, 27.5 inches wide	9.4
Carvès oven, 26.0 inches wide	11.3
Carvès oven, 19.7 inches wide	13.2
Beehive oven	6.2
Belgian oven	7.5
Coppée oven	11.4

It is claimed that, besides giving a denser, harder coke, the yield itself is also considerably increased. An additional advantage is that the heat of the gases can be utilized for generating steam. M. Jouguet states that at the Bessèges works, steam is produced to the extent of about 45 pounds and of 4½ atmospheres' pressure per hour and per ton of coal coked, and he thinks that, under more favorable circumstances, 59 pounds of steam should be obtained. Now, as at Bessèges 1400 kilos. (3080 pounds) of coal are carbonized per oven and per 24 hours, it follows that, taking about 17½ pounds of steam as necessary to produce one horse-power per hour, each oven gives about 3⅗ horse-power of motive power, and could be driven to give about 4¾ horse-power. At Bessèges all the machinery required in the manufacture of coke and its by-products is now being driven by steam raised in this way, and there remains a large surplus, which is used in the blowing engines for the Bessemer process for lifting charges to furnaces, &c.

Mr. Thos. Wrightson, of Stockton-on-Tees, read a supplementary paper entitled :

ON SOME PHYSICAL CHANGES OCCURRING IN IRON AND STEEL AT HIGH TEMPERATURES,

in which he detailed a number of facts observed by him and bearing upon that much-discussed subject, the floating of solid cast iron in liquid iron. Mr. Wrightson has constructed an apparatus, called by him the oncosimeter, for measuring the changes of volume in cast iron when passing from the liquid to the solid state. He found that, while cooling from the liquid state, cast iron expands as much as 0.51 per cent. lineally which is equivalent to an increase in volume of 1.53 per cent. Again, in contracting from its maximum volume to its cold state, it decreased in diameter 1.17 per cent. lineally, or 3.51 per cent. in volume. He also made a series of experiments with balls of Cleveland foundry pig immersed in fluid iron of the same quality, and found that on the average the iron, in passing from the solid to the plastic condition, expands from a specific gravity of 6.95, when cold, to 6.50, when plastic, while the fluid iron has a density of 6.88. He holds that the separation of graphite cannot be the cause of the expansion of the iron when cooling down from the liquid to the plastic state, because white iron, which has no or little graphitic carbon, does not act differently, but expands considerably. The paper brought about quite a long and animated discussion, which, however, did not contribute much toward a final settlement of the questions at issue.

Mr. J. E. Stead contributed a communication on an improved apparatus designed for the analysis of blast furnace and other gases, for which he claims that it greatly facilitates the work of making analytical examinations, as many as three, or even four, analyses of blast furnace gas being made in one hour. We may pass briefly over this paper and over that of Messrs. Parry and Tucker, to whose researches on the application of the spectroscope to the analysis of iron we referred some months since. Little importance attaches to the subject of Mr. A. H. Allen's paper on the existence of nitrogen in iron and steel. Mr. Demetrius Jouraffsky, of St. Petersburg, gave the results obtained by testing steel rails at natural and artificially lowered temperatures. The experiments were made at the instance of the Russian government, whose efforts were directed to obtaining a hard rail, which at the same time would not be too brittle in winter weather. The tables embodying the results were sharply and deservedly criticised, notably by M. Gruner. In general, it may be said that the impression that mild steel resists intense cold best, was confirmed. The meeting was brought to a close by the reading of a paper on the separation of silica in the analysis of limestones, iron ores and other minerals by Mr. H. Rocholl, of the Clarence Iron Works, Middlesbrough.

British Shipbuilding Interests.—The Glasgow *Mercantile Advertiser* says: The recent fall in the price of pig iron cuts two ways. On the one hand it has had a deteriorating effect on several classes of stock, involving a pecuniary loss to ironmasters ; and, on the other, it has had the effect of stimulating the shipbuilding trade. It is quite evident that both at home and abroad new vessels are required, and the lull in the iron trade, producing the fall in prices, has been the means of a number of contracts for large steamers coming to the front. These orders, however, have not yet covered the falling off in American orders ; but as soon as there is evidence of continued increased demand a reactionary movement in prices will at once begin. In this connection we may refer to the work finished on the Clyde in April. The various firms on the river launched during that month 18 vessels, of an aggreate tonnage of 23,765 tons. The vessels launched comprised 11 steamers, 3 saloon paddle steamers, 1 iron sailing bark, 1 yacht, 1 lighter, and 1 barge. The value of the returns for April will be seen by a comparison with those of previous periods. In March last the returns amounted to 17,567 tons ; in April, 1879, to 8420 tons ; in April, 1878, to 21,561 tons ; in April, 1877, to 14,700 tons ; in April, 1876, 14,400 tons ; in April, 1875, to 23,100 tons ; in April, 1874, to 13,000 tons ; and in April, 1873, to 27,500 tons. The figures for the month are made up chiefly by the launch of a new Anchor Liner of 3300 tons by Messrs. D. & W. Henderson & Co., a steamer of 3500 tons by Messrs. J. & G. Thomson, for the Canada Shipping Company, and three vessels (one by Messrs. A. and J. Inglis, and two by Messrs. John Elder & Co.) for the new fleet of the Compagnie General Transatlantique.

The tendency of Europe on tariff questions is plainly shown by an English blue book, which gives the changes since 1876. Holland is the only country which has made considerable reductions, and there all import duties have been removed from leather, copper, lead, and from cotton, woolen and silk yarns. Switzerland and Denmark have made slight changes. Greece has added 10 per cent. as a war tax, and the always prohibitory Russian tariff has been increased 30 per cent. by the collection of the tax in gold instead of in paper. Norway and Sweden have made heavy additions, but chiefly on such luxuries as sugar, spirits, tobacco, &c. German import duties have been largely increased—on fine cotton yarn by as much as 200 per cent., on linen yarn by 300 per cent., and crude and manufactured iron and steel, which formerly were on the free list, are now heavily taxed. In Italy the tariff on cotton yarns has been raised about 20 per cent. on the coarser varieties and over 100 per cent. on the finer. In Austria, a decline on the lower numbers is made up by an increase of 30 per cent. on the finer kinds. In silk goods there is an increase of from 25 to 90 per cent.

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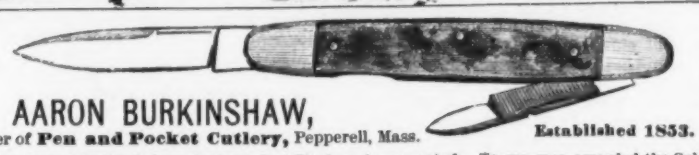

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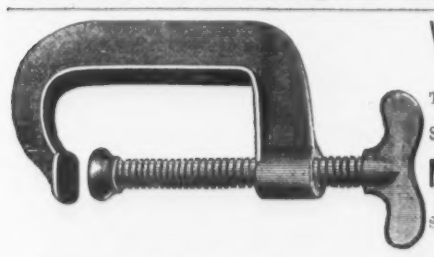

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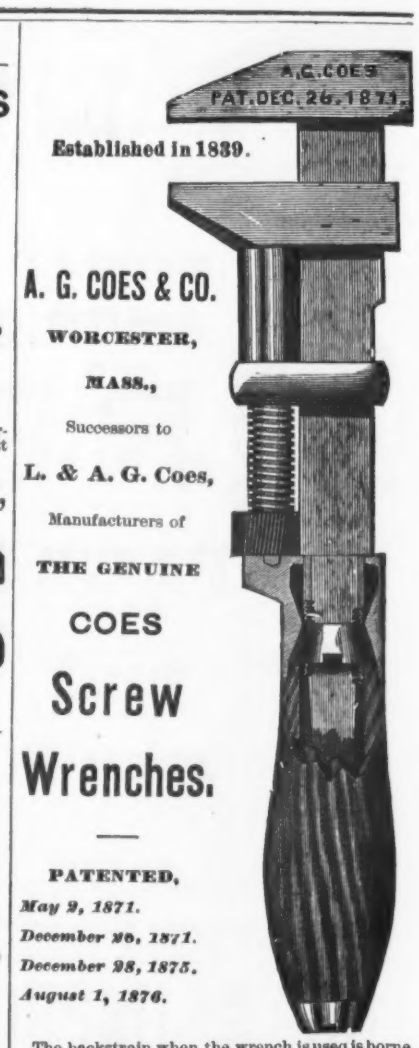

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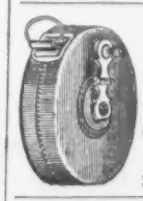

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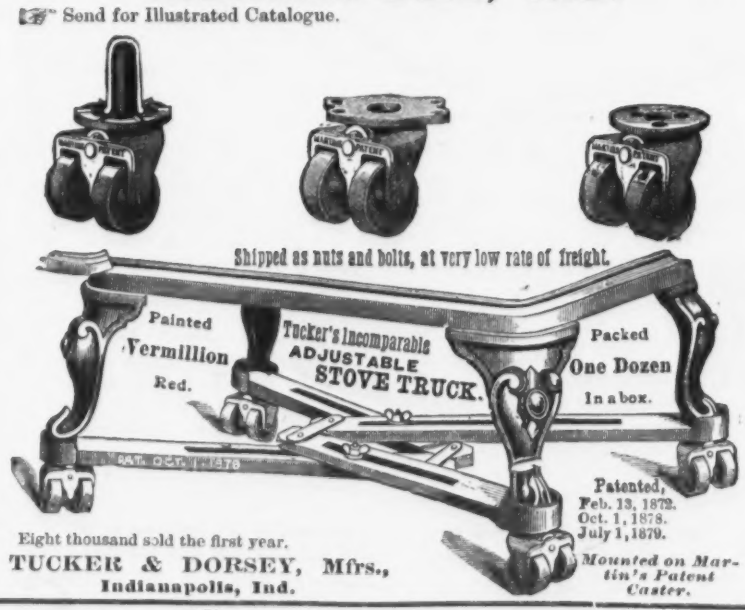

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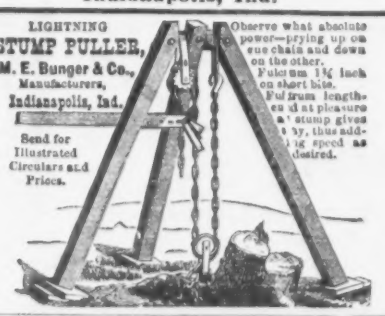
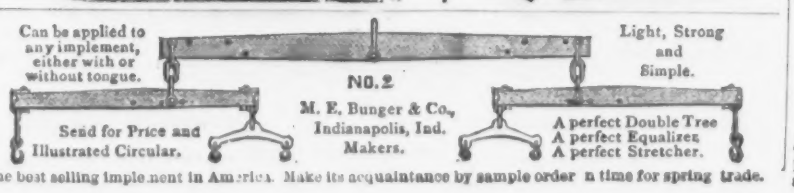




The best selling implement in America. Make its acquaintance by sample order in time for spring trade.

Statistics of the American Iron Trade in 1879.

(Continued.)

PRODUCTION OF IRON AND STEEL RAILS IN 1879.

The production of rails of all kinds in the United States in 1879 was the largest in the history of the country, amounting to 1,113,273 net tons, or 993,993 gross tons. The largest production previous to 1879 was in 1872, when 1,000,000 net tons, or 892,858 gross tons, were made.

The rail product of 1879 was composed of 683,964 net tons of Bessemer steel rails, 420,160 tons of iron rails, and 9149 tons of open-hearth rails. The total production in 1879 was 230,588 tons greater than in 1878. That of Bessemer steel rails was 133,566 tons greater, and that of iron rails was 97,270 tons greater; but there was a decrease in 1879 of 248 tons in the production of open-hearth steel rails as compared with 1878.

The production of street rails in 1879 is included in the aggregate production for the year, and amounted to 8646 tons, of which 5813 tons were Bessemer and open-hearth steel rails, and the remainder were iron rails. The production of street rails in the six preceding years was as follows: 1873, 9430 net tons; 1874, 6739 tons, of which 1000 tons were Bessemer steel; 1875, 16,340 tons, of which 2308 tons were Bessemer steel; 1876, 13,086 tons, of which 3563 tons were Bessemer steel; 1877, 7015 tons, of which 1269 tons were Bessemer steel; 1878, 9229 tons, of which 1710 tons were Bessemer and open-hearth steel.

The production of iron and steel rails in this country since the beginning of the manufacture of Bessemer steel rails has been as follows, in net tons:

Years.	Open-hearth steel rails.	Iron rails, all kinds.	Bessemer steel rails.	Total.
1867	.....	459,558	2,550	462,108
1868	.....	499,489	7,225	506,714
1869	.....	583,936	9,650	593,586
1870	.....	586,000	34,000	620,000
1871	.....	737,483	38,250	775,733
1872	.....	905,930	94,070	1,000,000
1873	.....	761,062	129,015	890,077
1874	.....	584,469	144,944	729,413
1875	.....	501,649	290,863	792,512
1876	.....	467,168	412,461	879,629
1877	.....	332,540	432,169	764,709
1878	9,397	322,890	550,398	882,685
1879	9,149	420,160	683,964	1,113,273

Included in the column of iron rails are a few tons of crucible steel rails and steel-headed rails, which it has not been thought necessary to separately classify. No crucible rails have been made since 1874, and but a few tons in that or in any preceding year. The production of both the classes of rails mentioned was as follows in 1873 and 1874: 1873, 26,377 net tons; 1874, 17,181 tons. The production of steel-headed rails in the last five years has been as follows: 1875, 19,436 tons; 1876, 12,791 tons; 1877, 5844 tons; 1878, 2288 tons; 1879, 9831 tons. The Elmira Iron and Steel Rolling Mill Company, at Elmira, N. Y., made all the steel-headed rails that were made in 1879, using "silicon tops."

The production of rails of all kinds in the United States from 1849 to 1879 has been as follows, in net tons:

Years.	Net tons.	Years.	Net tons.
1849	24,318	1865	356,292
1850	44,083	1866	430,778
1851	50,603	1867	462,108
1852	62,478	1868	506,714
1853	87,864	1869	593,586
1854	108,016	1870	620,000
1855	138,674	1871	775,733
1856	150,018	1872	1,000,000
1857	161,918	1873	890,077
1858	163,712	1874	729,413
1859	195,454	1875	792,512
1860	205,038	1876	879,629
1861	189,818	1877	764,709
1862	213,912	1878	882,685
1863	275,768	1879	1,113,273
1864	335,369		

The following table shows the production in net tons of rails of all kinds in the United States from 1876 to 1879 by States:

States.	1876.	1877.	1878.	1879.
Pennsylvania	353,925	347,968	406,266	498,336
Illinois	181,490	120,762	196,538	265,300
Ohio	100,769	82,270	87,520	109,386
New York	57,306	34,094	54,471	78,634
Wisconsin	21,280	21,439	28,900	30,890
Indiana	29,383	34,876	28,600	30,879
Kentucky	1,524	12,100	13,000	25,414
Tennessee	21,394	11,373	9,479	15,185
Georgia	9,000	10,031	8,345	11,259
Kansas	14,707	16,018	12,685	10,208
Wyoming Ter.	12,230	10,007	10,425	9,656
Massachusetts	9,061	9,640	7,995	7,725
California	8,629	5,750	6,779	6,936
Vermont	9,181	3,899	2,200	4,974
West Virginia	538	1,756	1,230	3,277
Colorado	.....	.....	1,600	2,500
Maryland	18,844	8,531	3,200	2,393
Maine	7,500	2,526	3,022	321
Missouri	20,903	31,289	362	.....
New Jersey	243	380	8	.....
Michigan	1,600	.....	.....	.....
Total	879,629	764,709	882,685	1,113,273

It will be seen that 17 States and one Territory made rails in 1879. Pennsylvania's production of 498,336 net tons in 1879 was the largest in her history. In 1875 her percentage of the total production of the year was 32.19; in 1876 it was 40.24; in 1877 it was 45.50; in 1878 it was 46; in 1879 it was 44.76. The production of 265,300 net tons in 1879 by Illinois was not only the largest in her history, but also the largest ever reached by any other State except Pennsylvania. It was 23.83 per cent. of the total production of the country. The other States which made more than 1 per cent. of the total production of rails in 1879 were as follows: Ohio, 9.82; New York, 7.06; Wisconsin and Indiana, each 2.77; Kentucky, 2.28; Tennessee, 1.36; Georgia, 1.01.

In 1849 the entire production of rails in the United States was 24,318 net tons. In 1879 the far Western States of Kansas, Colorado, and California and the Territory of Wyoming exceeded this product by 4982 tons. Their production was as follows: Kansas, 10,208 tons; Colorado, 2500 tons; California, 6936 tons; Wyoming, 9656 tons. In 1879 Illinois alone made more rails than the whole country made in any year prior to 1863.

CONSUMPTION OF IRON AND STEEL RAILS.

The following table will show approximately the consumption of rails in this country from 1867 to 1879, in net tons:

Calendar Years.	Made in United States	Imported.		Aproximate Consumption.
1867	462,108		163,049	625,157
1868	506,714		250,081	756,795
1869	593,586		313,163	906,749
1870	620,000		399,153	1,019,153
1871	775,733	Iron,	515,000	1,341,434
		Steel,	50,701	
1872	1,000,000	Iron,	381,064	1,530,850
		Steel,	149,786	
1873	890,077	Iron,	99,201	1,148,849
		Steel,	159,571	
1874	729,413	Iron,	7,796	837,724
		Steel,	100,515	
1875	792,512	Iron,	1,042	810,770
		Steel,	16,316	
1876	879,629	Iron,	287	879,916
		Steel,	None	
1877	764,709	Iron,	None	764,744
		Steel,	35	
1878	882,685	Iron,	None	882,695
		Steel,	10	
1879	1,113,273	Iron,	19,090	1,157,420
		Steel,	25,057	

We may here remark that we regard the claim that 1,500,000 gross tons of rails will be required by the new and old railroads of the country in 1880, and that American works cannot meet this requirement, as unwarranted by past experience and existing probabilities. It is true that in 1872 we required about 1,366,830 gross tons (1,530,850 net tons), but since the close of that year we have laid over 2,000,000 gross tons of steel rails, the superior wearing qualities of which must be considered in estimating the probable quantity of rails to be required this year for renewals of existing tracks, while the mileage of new roads to be finished in 1880 is not likely to greatly exceed the average of the three years, 1870, 1871 and 1872, which was 6466 miles. Hence it is not probable that we will require as many rails in 1880 as in 1872, and those that are required can all be made by American works. We produced in 1879 the astonishingly large quantity of 993,993 gross tons of rails, with a number of rail mills standing idle which have since been put in operation. With the additional facilities for production that have since been completed or undertaken, the country's capacity for the production of rails will this year be equal to all demands, but these demands will fall short of 1,500,000 gross tons.

PRICES OF IRON AND STEEL RAILS IN 1879 AND 1880.

The average yearly prices at which iron rails have been sold in this country during the past nine years are given below, the quotations being for best iron rails at Philadelphia per gross ton:

1871	$70.37½	1876	$41.25
1872	85.12½	1877	35.25
1873	76.66⅔	1878	33.75
1874	58.75	1879	41.25
1875	47.75		

The lowest quoted price at which iron rails have ever been sold in this country was $31.50 a ton in October, 1877. From that time until April, 1879, there was a steady advance to $35.50, and from April until the close of the year there was a rapid advance to $54. In January of this year there was a sudden jump to $65, and in February sales were made at $68. Since February the price has fallen to $50 at the middle of May.

The average yearly prices at which Bessemer steel rails have been sold in this country since 1868 are as follows, per gross ton, the figures given being the prices at the works in Pennsylvania.

Year.	Price.	Year.	Price.
1868	$158.50	1874	$94.25
1869	132.25	1875	68.75
1870	106.75	1876	59.25
1871	102.50	1877	45.50
1872	112.00	1878	42.25
1873	120.50	1879	48.25

The lowest quoted price at which Bessemer steel rails have ever been sold in this country was $40 a ton in November and December, 1877. From this price there was a gradual advance to $43.50 in May, 1878, but this price was not maintained throughout the year, sales being made in December at $41. But from this time forward the price steadily advanced until September, 1879, when it touched $50. From September, 1879, to February, 1880, there was a rapid advance to $85, from which price there has since been an equally rapid decline to $65 at the middle of May.

PRODUCTION OF BARS, ANGLES, PLATES, SHEETS, AND OTHER ROLLED IRON IN 1879.

By the term rolled iron we include (1) cut nails and spikes; (2) bar, angle, bolt, rod, skelp, and hoop iron; (3) plate and sheet iron; and (4) all sizes of iron rails. Bessemer steel rails are not classed among rolled iron products.

The production of all kinds of rolled iron in the United States in 1878, including iron rails, was 1,555,576 net tons, which was an increase of 78,817 tons over the production of 1877, but in 1879 the production reached the extraordinary quantity of 2,047,484 tons, which was more than 31 per cent. greater than that of 1878. This increase embraced all forms of rolled iron, the increase in the production of bar, angle, bolt, rod, skelp, and hoop iron being 276,168 tons; in plates and sheets, not including nail plate, 87,726 tons; in nail plate, 30,744 tons; in iron rails, 97,270 tons; total increase, 491,908 tons.

The following table gives the production of all kinds of rolled iron from 1864 to 1879, in net tons:

Years.	Iron Rails	Other Rolled Iron	Total.
1864	335,369	536,958	872,327
1865	356,292	500,048	856,340
1866	430,778	595,311	1,026,089
1867	459,558	579,838	1,039,396
1868	499,489	598,286	1,097,775
1869	583,936	642,420	1,226,356
1870	586,000	705,000	1,291,000
1871	737,483	710,000	1,447,483
1872	905,930	941,992	1,847,922
1873	761,062	1,076,368	1,837,430
1874	584,469	1,110,147	1,694,616
1875	501,649	1,007,867	1,509,516
1870	467,168	1,042,101	1,509,269
1877	332,540	1,144,219	1,476,759
1878	322,890	1,232,680	1,555,576
1879	420,160	1,627,324	2,047,484

The production of all kinds of rolled iron

in the United States from 1876 to 1879 was distributed as follows among the States:

States. Net Tons.	1876.	1877.	1878.	1879.
Maine	10,814	6,299	6,642	6,483
N. Hampshire	1,900	1,900	550	3,000
Vermont	9,183	3,899	700	3,300
Massachusetts	78,576	97,293	85,660	105,085
Rhode Island	7,394	7,500	8,000	9,800
Connecticut	10,114	7,298	10,138	13,486
New York	104,596	67,013	84,536	115,201
New Jersey	52,411	49,228	51,632	62,831
Pennsylvania	620,510	625,465	677,774	917,038
Delaware	17,598	18,249	14,427	26,923
Maryland	31,181	21,233	10,575	25,318
District of Col.	.....	.....	82	230
Virginia	17,306	17,592	22,424	31,675
Georgia	12,001	13,101	10,122	13,692
Alambia	1,000	700	500	1,000
West Virginia	49,636	57,150	53,483	67,290
Kentucky	30,874	45,788	37,000	64,096
Tennessee	23,274	17,902	20,280	23,969
Ohio	209,178	208,109	203,222	238,925
Indiana	55,262	69,520	64,115	66,678
Illinois	57,708	46,535	85,797	112,714
Michigan	5,325	3,200	4,855	12,276
Wisconsin	29,980	33,259	45,300	61,333
Missouri	30,956	20,776	18,001	22,096
Wyoming Ter.	12,320	10,007	10,425	9,656
Kansas	14,707	16,201	14,485	14,437
California	15,465	11,542	13,251	15,952
Colorado	.....	.....	1,600	2,500
Nebraska	.....	.....	.....	500
Total	1,509,269	1,476,759	1,555,576	2,047,484

The following table gives the production of bar, angle, bolt, rod, hoop, skelp, plate and sheet iron, including nail plate, from 1876 to 1879, by States:

States.	1876.	1877.	1878.	1879.
Maine	3,314	3,773	3,620	6,162
New Hampshire	1,900	1,900	550	3,000
Vermont	.....	.....	.....	.....
Massachusetts	69,515	87,653	77,665	97,360
Rhode Island	7,394	7,500	8,000	9,800
Connecticut	10,114	7,298	10,138	13,486
New York	73,401	59,160	75,245	87,983
New Jersey	52,168	48,848	51,624	62,831
Pennsylvania	470,335	528,028	587,441	791,389
Delaware	17,598	18,249	14,427	26,923
Maryland	12,337	12,702	7,375	22,925
Dis. of Columbia	.....	.....	82	230
Virginia	17,306	17,592	22,424	31,675
Georgia	3,001	3,070	1,777	2,433
Alabama	1,000	700	500	1,000
West Virginia	49,098	55,394	52,253	64,013
Kentucky	29,350	33,688	24,000	38,682
Tennessee	1,880	6,529	10,858	11,759
Ohio	148,529	161,978	169,042	196,019
Indiana	25,879	34,644	35,455	35,799
Illinois	9,931	15,292	33,044	45,295
Michigan	3,725	3,200	4,855	12,276
Wisconsin	8,700	11,820	16,400	30,443
Missouri	18,790	19,226	17,639	22,096
Wyoming Ter.	.....	.....	.....	.....
Kansas	.....	183	1,800	4,229
California	6,836	5,792	6,472	9,016
Colorado	.....	.....	.....	.....
Nebraska	.....	.....	.....	500
Total	1,042,101	1,444,219	1,232,686	1,627,324

The following table gives the production of bar, angle, bolt, rod, skelp and hoop iron in net tons from 1876 to 1879, by States:

States.	1876.	1877.	1878.	1879.
Maine	3,314	3,773	3,620	6,162
New Hampshire	1,500	1,800	500	3,000
Massachusetts	35,857	46,731	42,019	55,118
Rhode Island	6,900	7,500	8,000	9,800
Connecticut	10,114	7,298	10,138	13,486
New York	66,323	53,831	72,422	87,478
New Jersey	32,305	32,755	38,001	46,522
Pennsylvania	301,350	336,398	399,047	543,366
Delaware	11,168	11,250	8,648	17,427
Maryland	3,167	2,385	80	9,590
District of Col.	.....	.....	78	206
Virginia	12,334	11,687	16,025	24,721
Georgia	2,251	1,870	1,777	2,433
Alabama	1,000	700	500	1,000
West Virginia	1,704	3,123	3,746	4,518
Kentucky	16,658	13,013	13,700	22,112
Tennessee	1,450	4,527	7,648	6,557
Ohio	104,512	113,071	119,575	132,028
Indiana	13,664	18,957	19,762	19,736
Illinois	9,921	8,941	22,133	30,203
Michigan	1,900	1,550	3,455	8,526
Wisconsin	8,700	11,820	16,400	30,443
Missouri	17,028	16,576	15,291	19,125
California	6,836	5,792	6,472	9,016
Kansas	.....	183	1,800	4,229
Total	608,956	720,531	830,837	1,107,005

The production of plate and sheet iron, not including nail plate, was during the period from 1876 to 1879 as follows, by States:

PLATE AND SHEET IRON, NOT INCLUDING NAIL PLATE, NET TONS.

	1876.	1877.	1878.	1879.
New Hamphire	400	100	50	.....
Massachusetts	11,326	13,105	11,803	20,710
New York	3,498	1,522	500	.....
New Jersey	2,743	900	900	1,600
Pennsylvania	100,576	112,034	120,908	178,477
Delaware	6,430	6,999	5,779	9,436
Maryland	9,170	10,317	7,295	13,315
District of Columbia	.....	.....	4	24
West Virginia	1,947	2,800	4,000	5,300
Kentucky	7,733	8,925	6,300	8,480
Ohio	15,345	19,190	18,955	24,280
Indiana	2,500	2,050	1,800	1,325
Michigan	1,825	1,650	1,400	3,750
Missouri	1,762	2,650	2,348	2,671
Total	165,255	182,242	182,042	269,768

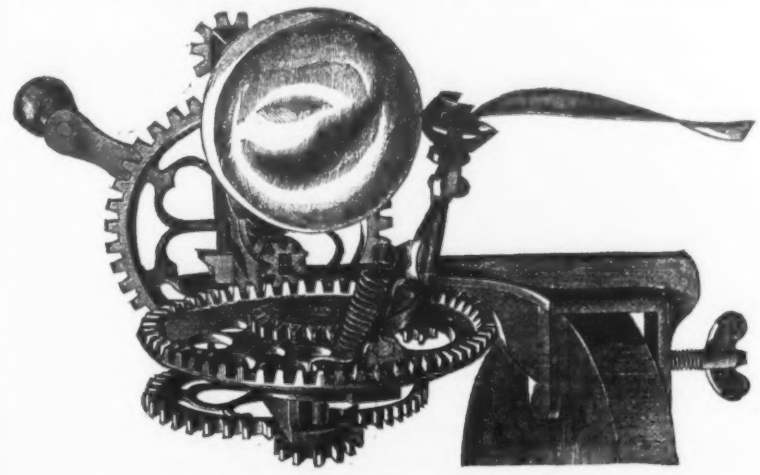
The production of cut nails and cut spikes from 1876 to 1879 was, for each State, in kegs, as follows:

States.	1876.	1877.	1878.	1879.
Massachusetts	446,638	556,344	476,863	430,240
Rhode Island	9,966	.....	.....	.....
New York	71,541	76,147	46,470	10,100
New Jersey	342,391	303,852	254,453	294,182
Pennsylvania	1,368,163	1,591,924	1,349,714	1,380,925
Virginia	119,426	118,091	127,970	139,076
Georgia	15 000	24,000	.....	.....
West Virginia	908,934	989,414	890,140	1,083,897
Kentucky	99,161	135,000	80,000	161,800
Tennessee	8,609	40,047	64,191	104,039
Ohio	574,459	591,336	610,245	794,230
Indiana	194,396	272,748	277,860	294,695
Illinois	200	127,615	213,224	301,837
Nebraska	.....	.....	.....	10,000
Total	4,157,814	4,828,918	4,396,130	5,011,021

The production of cut nails and cut spikes in 1879 was 614,891 kegs greater than in 1878, but only 182,103 kegs greater than in 1877. In the last-named year, however, there was an overproduction which rendered necessary the reduced output of 1878. That there was again an overproduction in 1879 seems probable from the fact that most of the nail works of the country suspended operations during six weeks in the early part of 1880. The production in 1879 was the highest ever attained.

Rotary Knife, Peach and Apple Parer.

We show in the accompanying illustration a mechanical novelty, which has much to commend it to favorable consideration. Its feature of chief interest is the rotary knife, which, revolving very rapidly, detatches the skin of the fruit more easily, and with none of the tearing experienced when the skin of ripe fruit is removed by rotating against a stationary knife. The paring removed by the rotary cutter is very thin and very clear. The knife is held against the fruit, accommodating itself to any irregularities of the surface, and the fork is so made as to inclose and hold a peach stone.



ROTARY KNIFE, PEACH AND APPLE PARER.

The makers pronounce this the only practical peach-peeling machine, and show a good record of service in large canning establishments. R. P. Scott & Co., 26-30 Orange street, Newark, N. J., are the makers.

LABOR AND WAGES.

The workmen in the principal rolling mills in Philadelphia, on May 25, stopped work on account of a reduction of 20 per cent. in their wages. The workmen say that they are willing to stand a reduction of 50 cents per ton, but that they will not accept 20 per cent. The manufacturers claim that the reduction was made necessary by the present low prices which have been caused by large importations of English iron. They also say that a further reduction will be necessary if the price of iron goes any lower. By this strike about 2500 men are thrown out of employment.

At Pittsburgh matters have about come to a head. The puddlers have renewed their demand for 50 cents advance, and the manufacturers have decided to hold out, and refuse to grant it. It was expected that most of the puddling furnaces in the Pittsburgh mills would be shut down on Tuesday last. It is understood that most of the Western mills will co-operate with the Pittsburgh mills in this case.

The E. & G. Brooke Iron Co., on May 27, informed the employees working at their blast furnaces that a reduction in their wages would take place upon June 1. The company are willing to pay the same prices for labor as are paid by neighboring firms engaged in the manufacture of pig iron.

The workmen in the Licking Rolling Mill, Covington, Ky., have struck against a reduction of wages, which comes from an agreement made last February, whereby wages should follow the price of iron. The workmen claim that they were not represented in that arrangement.

The wages of the puddlers at the Blandon Rolling Mill have been reduced from $5.25 to $4.50, taking effect May 1.

Leadville, Col., was thrown into great excitement on May 26 by the announcement that the 5000 miners about the camp had quit work. The strike was begun in the Chrysolite mine. The miners employed asked for an advance from $3.50 to $4 per day, and demanded to be allowed to select their own shift bosses. The example was followed generally throughout the camp, and the Chrysolite, Little Chief, Pittsburgh and all other principal mines were shut down. Work, however, was resumed on Monday last in two of the mines, and the strike is believed to be practically at an end.

Some of the hands employed in the pipe mill of the Reading Iron Works have been notified that their wages will be reduced 10 per cent. This reduction the company concluded to make several weeks ago, before they had any idea of the failure of the P. & R. Co.

The Roman Catholic Archbishop Taschereau, in Quebec, has issued a pastoral condemning trade unions. He puts in a succinct form a truth which we have had occasion over and over again to assert, when he says: "A man's labor is his own, and it is his liberty to sell it at whatsoever price he pleases." This sets forth the gist of the whole matter. It is announced that any Catholic who shall attack or conspire to attack any person, because such person works at a price which he thinks fit, shall be excommunicated. As the labor troubles have been considerable in Canada, and the gross tyranny with which strikes are usually conducted has there been particularly rampant, the pronunciamento of the Archbishop against them is specially timely; and everybody who in the least respects personal independence and liberty of choice will approve the Archbishop's utterances.

The Iron Age

AND

Metallurgical Review.

New York, Thursday, June 3, 1880.

DAVID WILLIAMS - - - *Publisher and Proprietor.*
JAMES C. BAYLES - - - *Editor.*
JOHN S. KING - - - - *Business Manager.*

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CONTENTS.

The Russian commission appointed to revise the customs duties of that country have finished their labors. The changes in the duties on metal goods are important, especially to England. Many privileges have hitherto been granted to home manufacturers importing foreign in default of sufficient native material. Premiums and exemptions from duty for certain quantities of foreign metal necessary in their manufactures have resulted in various abuses, and these privileges are abolished, with the exception of premiums accorded to native manufacturers in one or two cases. Notwithstanding the duty of 5 kopeks on foreign pig iron, it appears that, owing to the privileges referred to, there were no less than 5,450,350 poods imported free of duty out of a total import of 6,395,697 poods in the year 1878. It has been proposed by the commission to place a duty of 1 rouble 25 kopeks per pood upon agricultural machinery imported, which must naturally make a great difference to importers of this class of machinery. The duty of 5 kopeks per pood on pig iron is to be raised to 10 and 15 kopeks, and nearly all imported iron goods are to pay a corresponding increase of duty, Steel, however, is to have a decrease from 80 to 20 kopeks per pood.

The Beaver Falls Tariff Demonstration.

Certain newspapers, published chiefly in the interest of the New York importing trade, affect to be very much amused by the coming tariff demonstration at Beaver Falls, Pa. The idea of fifty thousand workingmen from all that part of the country, gathering with music and banners to listen to speeches and pass resolutions congratulating the country on having escaped the tariff revision so many times seriously menaced during this session of Congress, seems to the conductors of these newspapers a thing too funny to be seriously spoken of. They appear to think it very absurd that any one should be glad that the tariff has not been "reformed" in the log-rolling, blundering fashion in which those who have essayed the task have proposed to do it; and when such expressions of satisfaction come from the workingmen in a demonstration which is in part paid for by the contributions of manufacturers, they have no trouble in discovering that it is all a gigantic joke on the public, inasmuch as the workingmen assemble at their employers' expense to hurrah for protection and chant its praises, while the unseen hand of the rich monopolists and pampered beneficiaries of protection beats time behind the scenes.

But whether this demonstration is so very amusing as to compel laughter whenever it is mentioned, depends somewhat upon how it is looked at. We venture to say that, to the army of workingmen who take part in it, it means something more, and something nearer to their hearts, than the grandest political demonstration this country has witnessed since the tolling of the old bell in Philadelphia summoned the people of that city to hear that the Declaration of Independence had been signed. To these thousands of men fresh from the anvil, the bench and mine, it means a new declaration of the demand of the people of the United States for industrial independence—for entire, complete and perpetual emancipation from the dominion of British capital. It is no joke to them, and if the gentlemen who write so flippantly about the demonstration could attend it and observe with unprejudiced eyes what may there be seen, they would perhaps realize that protection is a very different thing in Western Pennsylvania from what it appears to be among the shipping offices and importers' warehouses of New York.

There is something about this Beaver Falls demonstration which must impress every thoughtful person. Workingmen in this country do not gather by thousands to throw up their hats and cheer at anybody's dictation. That some part of the expense of this workingmen's demonstration is borne by manufacturers, detracts in no respect from its genuineness or significance. They too have a deep and lasting interest in whatever promotes the stability of American industry, and in expressing their faith in protection as a principle, they are in hearty sympathy with the wage-earning classes. But the Beaver Falls demonstration is a workingmen's gathering and should be considered as such, as it has been organized and carried out by the Amalgamated Association of Iron, Steel and Tin Plate Workers. If, then, it is what we have stated, the jeers and laughter of the newspaper writers of whom we have spoken are as pointless and purposeless as the "crackle of thorns under a pot."

To the workingmen of this country protection means employment, fair wages and better conditions generally than they could hope to know without it. To borrow a favorite and familiar illustration, it is to them what the dikes that guard their coast are to the people of Holland. On the one side is the sea, beating and lashing its sterile sands—on the other blooming fields, fertile gardens, and happy and prosperous communities. Break down the dikes and the sea would sweep over these fields and gardens and drive the people to the hills. To say that the people who drained and reclaimed Holland and built these dikes made a mistake; that they should have settled on the higher lands which did not need draining, and left the waves to creep and swirl where they would in obedience to nature's laws, would be a good free-trade argument, but it would count for nothing with the people of Holland. By courage and enterprise their ancestors reclaimed a rich territory which would otherwise have been a waste. They made the earth yield a varied abundance where nature intended that only the coarse grass of salt marshes should grow; they made a large territory habitable which, if left to nature, would have been uninhabitable; they made a place for a nation where nature had made none. The labor and sacrifice which this work entailed are over; its good results will remain so long as the dikes stand and the wind blows to furnish power to empty the drainage canals. So it is with protection. Without stand the nations of Europe, eager to fill our markets with the products of cheaper labor than ours. Within we find a vast system of diversified industries, a prosperous people and a goodly land. Free trade says that interference with the natural laws of trade is all wrong; that the chief end of men and of nations is to depend upon the cheapest sources of production; that an industry which cannot live without protection has no excuse for being and should be crushed; and that if protection is only abolished there will be no more monopoly. This counts for as little with those whose labor is employed or whose capital is invested in productive or distributive industry, as a similar argument, based on "natural laws," would have with the people of Holland. Your workingman is not a student of political economy; he has not read the great English authorities on this subject, and does not feel any interest in the proceedings and publications of the Cobden Club. His answer will be based on his experience. He knows that with protection he is better off than he would be without it, or than workmen are in countries where they do not have it. He knows that with protection his labor is worth more, that he lives in a better house, eats better and more abundant food, dresses himself and his family better, has more comforts and enjoyments than would otherwise be possible. He realizes this more forcibly when, because of temporary conditions existing here, the pressure of merchandise from without overrides protection, floods the country, and keeps him idle for months, it may be, until the market can be cleared of surplus foreign stocks, and opportunity to resume domestic prodution is offered. If this can happen with a protection which English writers characterize as a Chinese wall, what would happen without it?

Suppose the American workingman was deprived of the protection he now enjoys, what would be the consequence to him? No one could assert, with any intelligent knowledge of the facts of the case, that the industries of the country would not suffer sharp contraction. Thousands of workmen would be thrown out of their accustomed employments, for which they are fitted by training and habit. Their only recourse would be agriculture, for which they are not fitted, and of which they know nothing. But were it possible for them to at once acquire land and engage successfully in its cultivation, the effort of this sudden diversion of labor to agriculture would inevitably be to swell our surplus food products beyond the requirements of our own and foreign markets. Such a diversion of labor from the mechanical trades to agriculture is possible in a gradual and small way—it is not possible in the sweeping way proposed by advanced free traders, much less is it desirable. The people of Holland could leave their pleasant and fertile low lands and settle somewhere else, but they do not want to, nor is it desirable for any reason that they should. The skilled mechanics working in mill and factory under protection could, perhaps, work their way West and settle on government land somewhere, but they will not do so voluntarily, nor would the change benefit them or the country at large. What sacrifices protection entailed on the American people at the outset have long ago passed; what it cost at that time has been repaid a hundredfold. All things considered, our own is at once the cheapest market to buy in and the best to sell in. If it costs the American workman more to live than it costs the British workman, he has more to live on and he lives better. None know this so well as those who have come here from free-trade countries, and none are more thoroughly and enthusiastically committed to the support of protection. In view of all these facts, we think the Beaver Falls demonstration had better be passed in silence by those who do not approve its object nor understand its significance.

Spanish American and Brazilian Trade.

In an editorial headed "Our Foreign Trade in 1879 and 1878," published May 20, we gave, among other tables. the following, showing the extent of our commerce with American countries in millions of dollars, the export being entirely domestic:

	Export.		Import.	
	1879.	1878.	1879.	1878.
Argentine Republic	2.10	1.63	3.69	4.59
Brazil	8.28	8.72	46.59	40.72
Central America	1.33	1.17	2.29	3.11
Chili	1.02	1.37	0.63	0.60
Danish West Indies	0.77	0.79	0.35	0.48
French West Indies	1.65	1.55	2.24	2.96
French Guiana	0.01	....	0.01	....
Miquelon	0.28	0.31	....	....
Nova Scotia, N. Brunswick and P. E. Islands	2.81	5.48	3.84	3.56
Quebec, Ontario, Manitoba and N. W. Ter.	20.67	23.37	23.25	20.65
British Columbia	1.97	1.38	0.97	0.89
Newfoundland and Labrador	1.27	1.10	0.30	0.29
British West Indies	6.32	7.21	3.90	4.84
British Guiana	1.66	1.93	0.82	0.75
British Honduras	0.29	....	0.27	....
Hayti	3.16	3.49	3.26	2.99
Mexico	5.67	5.36	0.09	5.20
Dutch West Indies	0.57	0.68	0.84	0.67
Dutch Guiana	0.21	....	0.23	....
Peru	1.17	1.29	0.77	2.31
St. Domingo	0.74	0.65	0.46	0.40
Cuba	11.43	11.48	57.74	60.44
Porto Rico	1.97	1.64	4.15	4.68
Colombia	5.26	4.76	0.91	5.56
Uruguay	0.84	1.87	2.33	2.17
Venezuela	2.13	2.38	5.31	6.23
Totals	83.64	89.61	177.44	174.09

With the exception of a few slight changes, the entire movement, both export and import, has been, it will be seen, remarkably steady, and it proves how firmly seated these relations are on both sides.

The trade we transact with some of the above countries is, however, not so large as it should be: they should take larger amounts of our goods, more in proportion to the quantities of produce we buy of them in a steadily increasing ratio. This we say with special reference to Brazil, and the cause may be easily explained. In part it is due to certain high duties levied there, and recently even raised still further, and is partly attributable to prejudice not easily overcome, the less so as our European rivals no doubt do all in their power to keep it alive. The consumer in Spanish America and Brazil, especially among the more humble classes of the community, is slow in adopting the use of goods he has not been accustomed to; he is averse to change. In considering further, we must also take into account the completeness of the European trade machinery there, represented by many old firms, powerfully backed in Europe and able to grant long credits; the multiplicity of European steamship lines taking freight very low, and the prestige which French goods, for example, enjoy in the chief centers of distribution—at Rio, in Para, Pernambuco and Bahia. In face of these difficulties, it is not surprising that the progress we have made in selling hardware, cotton goods and other manufactures has been slow; and this in spite of vigorous and persistent efforts. Yet we all feel so firmly convinced of the necessity of an expanding outlet for our surplus manufactures, and of the ultimate success which is to crown our strenuous endeavors, that not one of our merchants and manufacturers dealing with Brazil feels, we are sure, in the least discouraged, unless he exports or produces goods which a prohibitive tariff practically excludes from the Brazilian market—and in this the European manufacturer has no advantage over him. Certainly European competition neither frightens nor deters any of our shippers; hence persistent efforts must in the long run increase our Brazilian, as well as our Spanish-American trade.

The country nearest us toward the South is Mexico, and there, better than anywhere else in America, we ought to sell at least as many goods as in Brazil, the population being little less than that of the latter. Unfortunately, the purchasing capacity of the Mexican people is not nearly so large as that of the people of Brazil. The duties on many of our goods are very high in Mexico, and, adding to this high tax which they encounter the moment they are landed, the expensive inland transportation, mostly on mules' backs through desert salt plains and over rugged mountain passes, it will be found that the cost of the goods by the time they come to be sold, presupposes purchasers whose purses are well filled with Mexican dollars.

We shall mention a few goods and their cost a year since at New York and in the city of Mexico: A keg of nails, costing $2.25 here, would cost $14 in the city of Mexico; a barrel of flour, costing here $6, cost $29 there. Clothing pays a duty of 132 per cent.; the square yard of woolen cloth pays 18 to 60 cents, and muslin 11 cents. The duty per pound is 4 cents on flour, 11 cents on cheese, 10 cents on butter, 10 cents on hams, 60 cents on preserved fruit, 20 cents on preserved meat and fish, and 5 cents on nails. A common wagon pays $66, and a carriage $150 duty. These are the federal duties, to which must be added 25 per cent. ad valorem local dues collected by the States.

The export duty on silver is 13½ per cent., but as the exchange on London is 10 to 15 per cent. against Mexico, this is about equalized by compensation. Mexico now owes $78,417,565 abroad and $38,776,163 at home; together, $117,193,728; and not a cent of interest has been paid on this debt for years past.

The comparative purchasing power of Brazil, the various Spanish-American countries, Hayti and Jamaica, is best exhibited on showing the population, the amount of exports between the precious metals and merchandize, and the amount thus sent abroad per capita of the population. We have drawn up a little table to show this, in accordance with the latest returns we have at hand:

	Population.	Export.	Per capita.
Mexico	9,389,461	$28,772,194	$3.07
Central America	2,509,900	16,500,000	6.60
Cuba	1,394,516	90,000,000	66.63
Porto Rico	661,494	8,500,000	13.00
Hayti	550,000	8,591,000	15.50
St. Domingo	250,000	690,000	2.76
Jamaica	506,154	6,200,000	12.06
Colombia	2,950,017	9,984,000	3.33
Venezuela	1,784,197	17,300,000	9.70
Peru	2,699,945	35,000,000	13.20
Chili	2,136,724	37,771,000	18.00
Argentine Republic	2,400,000	45,000,000	19.00
Uruguay	440,000	16,000,000	36.40
Brazil	10,108,191	107,310,000	10.60
Totals	37,780,699	$427,618,194	$11.32

It will be seen that Cuba stands at the head of the list, Uruguay next, and that Mexico stands between St. Domingo, the lowest, and Colombia. Cuba is, however, not likely to remain at the top should the present insurrection attract the negro slaves, represented as gradually abandoning the sugar estates since the promised emancipation has been spread over some eight years, which many of these negroes prefer to shorten by retiring to the woods and joining the rebel forces. Productive capacity, moderate import and export duties on an average, or, if possible, no export duties; peace, internal and external, and railroads, combined with river navigation by steam where feasible, are the elements which will enrich the people of Spanish America and Brazil in the long run, and in our relations with them we must never lose sight of these elements. A large immigration, like the one the Argentine Republic is attracting, is another potent element of wealth. We trust that our manufacturers of machinery and agricultural implements will not neglect to attend the Argentine exhibition to come off next fall, as there is no country so well deserving our solicitude as an outlet for manufactures, &c., as that magnificent cattle, wool and wheat-producing Republic situate in the temperate zone, to which we send thus far only about half as much as we are importing from there.

The Iron "Boom" and the Government.

Now that the short-lived "boom" in the iron trade has become a thing of the past, and we are left to grapple with the problem of pulling through a period of depression, we may pause to inquire who besides our friends across the Atlantic have been benefitted. We find, naturally, that the government has every reason to be well content with the course which matters have taken, and that when accounts are balanced a very handsome amount will have been added to its receipts. We are indebted to Mr. Joseph Nimmo, Jr., Chief of the Bureau of Statistics, for the following statement of the amounts of duty collected on a number of the leading articles classified under iron and steel, during the six months ended December 31st, 1879:

	Duty.
Pig iron	$1,658,554.73
Bar iron	587,937.01
Band, hoop and scroll	47,942.76
Railroad or rails	246,144.12
Steel in ingots, bars, &c	201,165.34
Railway bars or rails (steel)	555,386.18
Do. (part of steel)	578.16

The articles in the list have returned to the government almost $3,300,000. It does not, however, include the important items of scrap and old iron, of which we imported during the last six months of the year, 213,384 tons, which being almost exclusively wrought scrap, would yield, at $8 per ton, as much as $1,600,000. Taking a number of other articles imported into this country in minor quantities, it will not be too much to say that the total foots up to $5,000,000. Looking over the statistical returns for the first three months of the present year, ending March 31st, we note the following: Pig iron imported, 179,491 tons, at $7 per ton brought $1,256,000; scrap, for 154,738 tons, $1,200,000; bar iron, averaging 1 cent per pound on 87,182,200 pounds, $870,000; band, hoop and scroll iron, at an average of 1⅜ cents per pound on 3,614,463 pounds, $50,000; iron rails, on 16,230 tons at a duty of $14 per ton, $227,000; steel rails, on 13,457 tons at the rate of $28 per ton, $377,000, and steel ingots, bars, etc., valued at $1,273,937, at approximately 40 per cent. ad valorem, $510,000. Together, these items represent $4,490,000, so that we are probably within the mark when we state that till the 1st of April the government derived a revenue of very nearly ten millions of dollars. We know that during April the shipments to this country were heavier than they had been before, and, together with May and June, the fiscal year will close with a very heavy balance in favor of the government, showing, in all likelihood, an increase of the duty collected on iron and steel over the preceding year of at least eleven millions of dollars.

The Prejudice and Conceit of English Workmen.

The Sheffield correspondent of the London *Trade Journal* repeats an old story as follows:

A curious fact has come to my knowledge in regard to the razor trade. Last spring a manufacturing firm removed from Sheffield to America. They took with them the various workmen necessary to make Sheffield razors in the States. A rumor, to which little credence was attached at the time, was to the effect that American water would not suit for hardening purposes. To provide against any possible failure on that account, tanks for the storing of Sheffield water were specially constructed, and the water was taken across the Atlantic, and used in the process of "hardening." The day came, however, when the water was exhausted, and recourse was had to the native element. Then it was found that the rumor was no fiction. The American water would not harden razor-blades, nor even give the polish necessary for the secondary sorts. And now I hear the emigrants are returning to Sheffield, and all fear of one of our oldest staple trades being transferred to the States is at an end.

This is simply arrant nonsense. It is true that one lot of Sheffield cutlers who came to this country brought with them what was alleged to be Sheffield water, but the idea that it had any special virtue for tempering or grinding was merely a notion having its origin in ignorance and prejudice. A few years ago a large proportion of English blacksmiths in this country could not work anything but English steel. When they were given anything which they knew or suspected to be American steel they were sure to spoil it, and were vehement in their assurances that it could not be worked successfully. This lasted until employers found out that American steel could be worked as well as any other if it only had English marks on it, and when the blacksmiths found that they had to choose between working American steel or looking for another place, they quickly made the discovery that it was good material.

From such conceited, obstinate, cantankerous people as the company of Sheffield cutlers who brought Sheffield water for tempering and grinding, nothing else could be expected. Experience with them showed conclusively that the colonization system is a

failure so far as these people are concerned. Nothing suited them, nothing was right, none of the promises made them were kept, nothing that could be done for them was satisfactory. They had the idea that they alone knew their trade and that their employers were dependent on them. This impression was strengthened by the amount of attention they received from newspaper reporters, and by the fact that for some time they were incautiously lionized in a most unaccustomed way. After the colony was broken up and the members of it had sought employment wherever they could find it, most of them did well enough and soon lost the offensive self-conceit which characterized them on their arrival. We doubt if manufacturers will again make the mistake of importing English workmen as organized companies, since the result in every case is likely to be a failure of the experiment and a scattering of the workmen in time to avoid the repayment of ocean fares and expenses. It is much better to let these superskilled, ignorant English mechanics come here on their own account and seek employment like other men. It is better for them and better for those who employ them. They are mostly good workmen, but it is not judicious to encourage them in the belief that they know more than they do, or that they bring with them any art which is not as well known and as well practiced in this country.

Tariff Matters at Washington.

(*From Our Own Correspondent.*)

WASHINGTON, D. C., June 2, 1880.

The importers of hoop iron having failed to secure a report favorable to their interests, and representative Tucker, who has the question of hoop iron under his control in the House, having been unsuccessful in his efforts to secure action on this subject in order to relieve the importers from the effects of the decision of April 17, 1880, which restored the duty on this class of iron from 35 per cent. ad valorem to the specific rate, several attempts have been made to bring the manufactures of iron commercially known as "cotton ties" under the same ruling. For the purpose of enabling collectors and other officers of the customs service to act intelligently on this subject, and in accordance with the views of the department, the Secretary of the Treasury has issued the following order, which discriminates between cotton ties to be rated as manufactures of iron, and those that are classed under the head of cut hoops:

TREASURY DEPARTMENT,
OFFICE OF THE SECRETARY,
WASHINGTON, D. C., May 27, 1880.

To Collectors and other Officers of Customs: The question has been presented to this department whether, under the ruling contained in decision (synopsis 4496) of April 17, 1880, in regard to the duty on cut hoop iron, bands of hoop iron cut to lengths and punched with holes at one end, are, when accompanied by buckles to be used with the bands of hoop iron as cotton ties, to be classed as manufactures of iron not otherwise provided for, or as subject to duty at the specific rates imposed on hoop iron. Hoop iron intended for use as cotton ties appears to be fitted for such use in various ways.

One description of cotton tie has a permanent stud fastened in the end of the band, with corresponding holes in the other end. This article is considered by the department as being properly liable to the duty imposed on manufactures of iron.

Other bands of iron are imported for cotton ties which in no wise differ from similar merchandise imported as cut hoops, except in the fact that they are punched to a greater extent, and are sometimes painted. The buckles are not attached to them as imported, and the buckles form a separate branch of manufacture.

It is held that the bands of hoop iron before referred to, whether accompanied or unaccompanied by the buckles, are liable, under decision 4496, to the duty imposed on hoop iron.

H. F. FRENCH,
Assistant Secretary.

Representative Tucker says that he does not yet despair of securing some action on the resolution which he was authorized to report by the unanimous consent of the Committee on Ways and Means, providing for the admission of all hoop iron cut to lengths contracted for prior to March 12th, at 35 per cent. ad valorem. On Monday he made an effort to obtain the consent of the House to call this bill up for consideration, but it was objected to by Mr. Henderson, of Illinois. A large number of letters have been received from the iron centers throughout the country, urging representatives to antagonize this measure, even though it be dispossessed of the other feature embraced in the original bill, of making the ad valorem rate of 35 per cent. the fixed duty on this class of iron. There now being scarcely a quorum of the House present, owing to the absence of a large number of Republicans attending the Chicago convention, and the number of pairs which have been arranged, and pending their absence, it is not probable that a vote will be allowed on this question, as it would now be regarded as taking an unfair advantage.

Upon the return of the Republicans from Chicago, the desire to secure an early adjournment of Congress will frustrate any further attempts to consider this subject. By way of varying the monotony of the appropriation bills during the past week, the Senate has been entertained with a number of speeches on the bill known as the "Tariff Commission Bill," which is the regular order of that body. This measure seems to be gaining strength daily, and although the want of time may prevent any concurrent legislation on the subject at this session, the proposition has many friends, and, it is thought, will be most likely adopted as the best method of disposing of the tariff question. The following is the text of the various measures which have been introduced in the Senate and reported from the Committee on Finance. They will explain themselves:

On Dec. 17, 1879, Senator Eaton, of Connecticut, introduced a bill which was referred to the Committee on Finance, and on April 13, 1880, was referred back by Mr. Bayard with amendments, the latter being in italics.

A Bill to provide for the appointment of a commission to investigate the question of the tariff.

Be it enacted, &c., That a commission is hereby created, to be called the "Tariff Commission," to consist of nine members.

Sec. 2. The President of the United States shall, by and with the advice and consent of the Senate, appoint nine commissioners from civil life, one of whom, the first named, shall be president of the commission. The commissioners shall receive as compensation for their services, each, at the rate of $10 per day when engaged in active duty, and a reasonable sum for (*actual*) traveling and other necessary expenses. The commission shall have power to employ a stenographer, who shall also be the clerk of the commission and a messenger; (*and the foregoing compensation and expenses to be audited and paid by the Secretary of the Treasury.*)

Sec. 3. It shall be the duty of said commission to take into consideration and thoroughly investigate all the various questions relating to the agricultural, commercial, (*mercantile,*) manufacturing, mining (*and industrial*) interests of the United States, so far as the same may be necessary to the establishment of a judicious tariff (*or a revision of the existing tariff upon a scale of justice to all interests;*) and for the purpose of fully examining the matters which may come before it, said commission, in the prosecution of its inquiries is empowered to visit such different portions and sections of the country as it may deem advisable.

Sec. 4. The commission, after full inquiry and investigation, shall report to Congress the results thereof (*of their investigation, and the testimony taken in the course of the same, from time to time, and make their final report not later than the first Monday in December,* 1881.)

On December 18, 1879, Senator Garland introduced the following bill, looking to the establishment of a commission to examine into the subject of the tariff, with a view of facilitating legislation in reference thereto:

Be it enacted, &c., That a commission is hereby authorized and constituted, to consist of three Senators to be appointed by the Senate, three members of the House of Representatives to be appointed by the Speaker of the House, and three others, not members of either house, to be selected by and associated with them, with authority to determine the times and places of meeting, to employ a stenographer, and to take evidence, and whose duty it shall be to inquire: First, into the relative effects of the tariff under the existing law upon the different industries of the country; second, into the relative effects of the present tariff upon the consumer and producer; third, as to the relative merits of the specific and the ad valorem systems; fourth, what, if any, improper discriminations exist under the present laws; fifth, what, if any, changes are necessary to be made to insure a wholesome and judicious law on the subject, and to secure its proper enforcement, and especially if the law cannot be greatly simplified, and the list of dutiable articles diminished, and the law executed at much less expense than it is at present; sixth, look into and review the whole tariff system as now existing; and seventh, the said commissioners to report the results of their examination into the subject above referred to, with such suggestions and recommendations as to them may seem proper, to Congress, at the earliest day practicable.

To this was submitted the following amendment, intended to be proposed by Mr. Kirkwood to Mr. Garland's amendment to the bill (S. 900) to provide for the appointment of a commission to investigate the question of the tariff, viz: After the word "existing," in line 26, strike out the words "and seventh," and insert "Seventh. The system of charges and fees of all kinds required to be paid at the principal ports of entry in the United States for the lading, unlading, clearance, and pilotage of vessels engaged in foreign commerce; and, Eighth."

Senator Blaine says that it is doubtful whether he will be able to be present at the grand picnic of the Amalgamated Iron and Steel Association, at Beaver, in Western Pennsylvania, on Saturday, June 5. He has been giving his personal attention to his efforts to secure the Presidential nomination at Chicago, and to facilitate communication with his friends there has a private wire in his library, where he now spends his entire time. Representative Garfield said before leaving here for Chicago that he would stop at Beaver on his return from the convention. Representative Bayne, who is also one of the orators of the occasion, will leave here on Friday. Information received here says it will be one of the largest demonstrations of labor and capital, in the interests of their specific industries, that has ever been witnessed in the United States.

NEW PUBLICATIONS.

The J. L. Mott Iron Works, New York, send us their illustrated catalogue and price list for 1880. The catalogue is a large folio volume, handsomely printed on tinted paper and profusely illustrated with cuts representing pieces of statuary, fountains, vases and ornamental ironwork of every description. It is quite a work of art, and will amply repay examination.

Death of Thomas Wood.—Mr. Thomas Wood, of the firm of Alan Wood & Co., and the second son of its founder, died in Philadelphia on May 23d, in his fifty-third year. He was the senior partner of the firm of Alan Wood & Co., and was born in December, 1827, in Delaware. His education was received in Philadelphia, and he was a graduate of the University of Pennsylvania in the class of 1846. He subsequently entered the law office of the late Henry J. Williams as a student-at-law, and was admitted to practice at the bar in 1850. He was a very accurate scholar and possessed great ability as a financier. On him devolved the purchases and sales of the firm and the conducting of all financial transactions arising in the course of its extensive business.

The St. Louis Convention of the American Society of Civil Engineers.

The sessions of the Twelfth Annual Convention of the American Society of Civil Engineers were opened in the Hall of the Washington University, at St. Louis, on the morning of May 25th. The attendance of members and guests was very large, even at the opening session, nearly 200 being present. The society has adopted the very generous policy of inviting the members of the leading engineers' societies of the country, and also the editors of prominent technical journals to attend their conventions and participate in the excursions connected therewith. Representatives were present of the Boston Society of Civil Engineers, of the Engineers' Society of Western Pennsylvania, of the Engineers' Club of the Northwest, of the Engineers' Club of St. Louis, of the American Institute of Mining Engineers, and of the American Society of Mechanical Engineers. Many of the members of the society are also members of one or more of these societies, which would make their representation far greater. Among those present were the following:

James P. Allen, Rock Island, Ill.; John B. Atchison, Earlington, Ky.; E. R. Andrews, New York; Ed. Adams, Pittsburgh; Theodore Allen, St. Louis; Charles B. Brush, Hoboken, N. J.; John W. Bacon, Danbury, Conn.; Arthur Beardsley, Swarthmore, Pa.; Fred'k Brook, Boston; G. Bruscaren, Cincinnati; H. S. Blunden, New York; John Bogart, New York; C. E. Billen, Philadelphia; Edwin Bauman, Chicago; H. Bissell, Salem, Mass.; Robert Briggs, Philadelphia; E. L. Brennerman, St. Louis; A. H. Blaisdell, St. Louis; James D. Burr, Topeka; Charles F. Bates, Chicago; William B. Coggswell, Syracuse, N. Y.; J. H. Cunningham, Milwaukee; Mr. Coryell, Lambertville, N. J.; J. A. Coulter, Pittsburgh; O. E. Cushing, Lowell, Mass.; Theodore Cooper, New York; J. J. R. Cross, New York; D. M. Currie, St. Louis; H. Constable, Philadelphia; R. Chauvenet, St. Louis; A. J. Chaphe, St. Louis; M. Cowles, Chicago; Alexander Dempster, Pittsburgh; E. A. Downs, Meadville, Pa.; C. G. Jarrad, Philadelphia; M. M. Defrees, Indianapolis; James B. Eads, St. Louis; George D. Emerson, Rolla, Mo.; James B. Francis, Lowell, Mass.; C. G. Force, Cleveland; G. H. Frost, New York; Clark Fisher, Trenton, N. J.; H. Fleming, New York; Henry Flad, St. Louis; Bryant Godwin, New York; Frank Graff, Philadelphia; P. Golay, Paducah, Ky.; Carl Gayler, St. Louis; A. B. Hill, New Haven, Conn.; J. H. Harlow, Pittsburgh, Pa.; F. B. Howard, Detroit, Mich.; W. R. Hutton, Baltimore; B. M. Harrod, New Orleans; L. M. Johnson, St. Louis; W. W. Jeffries, Westchester, Pa.; J. Johann, St. Louis; Ralston R. Jones, Keokuk; Louis H. Knapp, Buffalo; R. Klemm, St. Louis; E. D. Leavitt, Jr., Cambridgeport, Mass.; Wm. H. Lotz, Chicago; D. J. Lucas, Philadelphia; Thomas B. Lee, Newark, N. J.; E. C. Lewis, Nashville, Tenn.; T. D. Lovett, Cincinnati; Henry G. Morris, Philadelphia; M. Morrison, Bethlehem, Pa.; Charles MacDonald, New York; M. Meigs, Rock Island, Ill.; R. E. McMath, St. Louis; John McLeod, Louisville; C. S. Maurice, Athens, Pa.; Henry G. Morse, Youngstown, Ohio; James McNaughton, Albany, N. Y.; D. N. Melvin, Staten Island; L. E. Madera, Philadelphia; H. Murphy, Philadelphia; W. H. McClintock, Fair Grounds, Ky.; T. H. MacLind, St. Louis; J. H. Maxon, St. Louis; T. B. Moulton, St. Louis; Robert Moon, St. Louis; R. E. McMath, St. Louis; J. O. Osgood, Milton, Mass.; E. B. Noyes, Lowell, Mass.; F. O. Norton, New York; George B. Nicholson, Cincinnati; George C. Prussig, Chicago; Geo. H. Pond, St. Louis; W. B. Potter, St. Louis; George H. Pegram, St. Louis; Jas. R. Richards, Boston; P. Roberts, Jr., Philadelphia; W. M. Rees, Memphis; A. Rauschenbach, St. Louis; E. C. Rice, St. Louis; J. K. Rees, St. Louis; M. E. Schmidt, Memphis; S. Sheldon, Cleveland; C. L. Strobel, Pittsburgh; P. W. Schauerffel, St. Louis; C. Schaler Smith, St. Louis; Wm. P. Shinn, St. Louis; Chas. A. Smith, St. Louis; C. H. Sherman, St. Louis; Chas. Stevens, St. Louis; T. S. Smith, St. Louis; M. M. Tidd, Boston; C. Talcott, Newark, N. J.; John G. Van Homme, Jersey City; Wm. H. Wiley, Orange, N. J.; Frank O. Whitney, Boston; D. W. Willman, St. Louis; S. Whinery, Wheeler, Ala.; C. D. Ward, Jersey City; Carl Van Wagner, Pittsburgh; J. D. Weeks, Pittsburgh; Ashbel Welch, Lambertville, N. J.; W. E. Worthen, New York; C. M. Woodward, St. Louis; S. H. Yonge, St. Charles, Mo.; J. W. Werten, Chicago; Wm. Woodward, New York; M. Williamson, Philadelphia; D. J. Whittemore, Milwaukie; John Whitelaw, Cleveland.

The president of the society, Mr. Albert Fink, being absent, Mr. Jas. B. Francis, of Lowell, Mass., first vice-president, called the convention to order, and, in accordance with the rules of the society which provide for the election of presiding officers of the convention from the members not officers, Capt. J. B. Eads and Mr. Wm. P. Shinn were elected chairman and vice-chairman respectively.

In taking the chair, Capt. Eads acknowledged the honor in a graceful speech.

Hon. Henry Overstolz, mayor of St. Louis, was introduced by the chairman and delivered an address of welcome to the convention.

The first paper read was one by Mr. Charles B. Brush, of New York city, on the

HUDSON RIVER TUNNEL.

We have already published (in our issue of May 20) an illustrated article on this tunnel. Mr. Brush entered fully into the details of the construction, but as these are of only special interest to civil engineers, we will not repeat the paper.

This was followed by a paper on

PERUVIAN TUNNELS,

by O. F. Nichols, who referred chiefly to the Chisbote Tunnel, on the Chisbote and Huarez narrow-gauge railroad. The engineering difficulties to be surmounted in this work were chiefly those of access and transportation over mountain roads and rocky canyons. In some instances men had to be let down to their work 200 feet by ropes from overhanging cliffs, while in others the barefoot natives were employed on smooth rock slopes of 40 degrees inclination, being held from falling by ropes about their waists.

This concluded the morning programme, and the convention adjourned to the Lindell for lunch.

Tuesday's Excursions.

The programme of the excursions for Tuesday included a visit to St. Charles, Mo., and the inspection of the bridge across the Missouri River at that point, and a steamboat ride down this river and the "Father of Waters" to St. Louis. The trip was a most delightful as well as interesting one. A run of an hour over the Wabash, St. Louis and Pacific Railroad brought the party to the bridge. This bridge, at the time it was built, 12 years since, was a wonderful piece of engineering, and though its grandeur has been eclipsed by later structures, the boldness of the undertaking has not been lessened. The bridge proper is approached by a curved trestle some 2000 feet long. It is of the truss pattern, some 100 feet above low water. One span fell on November 8, 1879, as the result of the derailment of a train. This span has since been rebuilt, and, so far as possible, the late improvements in bridge building have been incorporated in the new span. The span which was finished April 1, 1880, is 312 feet in length, in 18 panels; depth, 31 feet 6 inches; width between truss centers, 18 feet. The floor of the bridge is the especial feature of interest, and consists of iron beams 30 inches deep and securely riveted to the posts, carrying six lines of iron stringers, and one central wooden stringer, to which the cross ties are spiked. The cross ties are white oak, 6 by 8 inches, and 14 feet long, and placed 12 inches between centers. On each side of the rail is an iron trough, 10 inches wide and 5 inches deep, and outside of this a guard timber 12 by 12 inches, securely bolted to every tier. The cast iron upper cord has been supplanted by one of wrought iron.

The party left the cars at St. Charles and took the steamer T. F. Eckert for the trip down the rivers.

Second Day's Proceedings.

The session of the society for Wednesday morning was occupied by the reading of two papers on cements, one by Mr. D. J. Whittemore, chief engineer of the C. U. and St. P. Railway, on the "Tensile Test of Cements and an Appliance for More Accurate Determinations," and one by Mr. F. O. Norton, of New York, on "American Cements."

Mr. Whittemore began with a statement regarding the form of samples used to list cements. Lipowitz, of Germany, in his work on Portland cement, advises the use of briquettes having a form and size of breaking section 3 x 6 centimeters. Manufacturers of hydraulic cements in this country employ a breaking area of 1 inch square.

Referring to the importance of knowing the actual linear measure of the breaking section, Mr. Whittemore gave the result of numerous experiments made by him, in the endeavor, by a comparison of results, to determine some more satisfactory and correct unit of measure than the expression of area, now so universally used. An explanation of Mr. Whittemore's apparatus was given, and the results of his experiments were referred to at length. It is known, he said, that in tensile tests particularly the apparent strength per square unit of ruptured area is greater in small than in large briquettes, and in making his experiments to determine the ratio of this apparent variation, he used cylindrical briquettes of two sizes, the larger one having a breaking section of two square inches and a form and clutch appliance, and the smaller a breaking area of one-half of one square inch, with a form and clutch devised and made by himself.

In making his tests he used four of the typical brands of American hydraulic cements, and one sample of English Portland. Tables giving the analysis of the cements were produced, showing that American hydraulic cements vary 20 per cent. in weight, rendering it almost impossible, therefore, to devise any expression referring to weight alone that will determine what quantity of water is required to produce mortars of a uniform degree of elasticity. He has also failed, as yet, to determine any exact relation from bulk measurement for this purpose. From the tests made, the results being shown by numerous tables, it was seen that the apparent strength per square inch of the smaller briquette is about double that of the larger, and that the diameter or periphery of the breaking section of the briquettes is about proportional to their ultimate strength. In view of the results obtained, he conceived it possible that the surface of the specimens had acquired a tenacity not extending throughout the entire mass, and that a surface hardening had taken place, through some process of crystallization, or by the absorption of carbonic acid, forming sub-carbonates. From the remarkable effects witnessed by him in the so-called carbonization process, he experimented to discover if the same effect could not be secured by ordinary water exposure. To determine whether water absorbed carbonic acid from the air and imparted it to the cement, he procured eight specimens of Portland and American cement, and placed four of them in distilled water, hermetically sealed in glass jars, and the others in the water of common use. The specimens in the sealed tubes soon became covered with a scale of hydrate of lime, which, upon exposure, was converted into a carbonate. No such result was noticed in the specimens unsealed in the undistilled water. After 40 days an analysis was made of all the specimens. None of the American cements had absorbed any carbonic acid at all, but the Portland had absorbed slightly. But it was found that the specimens placed in the distilled water and sealed jars were all stronger than any of the others, and the average tensile strength was 21 per cent. greater. The speaker did not think, from his experiments, that the American cements absorbed carbonic acid at all.

The remarkable effects obtained by the carbonization process, he thought, might be attributed to the moderately high temperature necessary in the process.

Some interesting points were brought out in the discussion that followed. Mr. Ashbel Welch stated that American cement had been discovered by Mr. Camas White, who was sent over by the State of New York, when they were building the Erie Canal, to England to make provisions for the cement needed. He found there were two difficulties in using that cement. In the first place it was very dear; in the second place, after they had brought it here after being six weeks on the ocean, it was good for nothing. Judging that cement consisted of slate and limestone, he endeavored to find his way out of the difficulty. He discovered quarries at Chittenango, Western New York. He examined them and found cement could be manufactured therefrom, and that was the beginning of American cement. The State of New York gave him $10,000 for this discovery.

The great diversity in the results of tests of cements was remarked upon, and also the difference in those tests arising for the shorter or longer periods of time covered by them.

Mr. F. O. Morton's paper on

AMERICAN CEMENTS

followed. The paper described the result of experiments begun in 1878, and was illustrated by plans exhibited on the platform. Mr. Norton had experimented with 5824 test briquettes manufactured at Rosendale, Ulster County, New York.

The production of cement at the Rosendale Works was 1,000,000 to 1,500,000 barrels during the season, which lasted from eight to nine months, that being the period navigation on the Hudson River was practicable between Rondout and New York. The results of these experiments proved conclusively that a cement of high standard strength can be continuously produced from the quarries in Ulster County, New York. The results may be summed up thus: Cement consisting of one part cement to one part sand. Rosendale had a tensile strength of 257 pounds to the square inch, and cost 68 cents per barrel, while the same quality Portland resisted a pressure of 224 feet to the square inch, and cost $1.22 per barrel.

One interesting result of the gentleman's researches was the establishment of the fact that, when a small amount of water is used in mixing the cement, it gives a greater tensile strength than when the dry mixture was used, but only for a period of three months. After that period the reverse is true. The record of cement tests running through a number of years was placed at the disposal of the convention.

Quite a discussion followed the reading of this paper.

Vice-President Francis related how cement is made in England. He had visited some of the works in London where the cement was made out of the material found on the spot. The works referred to were on the banks of the Thames at Northfleet, where 100 tons and more was turned out daily. The material used was chalk, which was found on a hill in the vicinity, and mud which was found in the river—dredged out. That was all the material that was used, except fuel. These were mixed in a proper proportion, arrived at by frequent tests, and the excellence of the cement depended upon its manipulation and watching of proportions. The first process was a rough mixture of the right quantity of clay and chalk, which was measured and thrown into a rough mill in which it was ground up very roughly. After that it was passed through stone like a grist mill, then allowed to settle, when it was cut up into lumps and burnt at a very high temperature. After the fuel was burnt out it was broken up and then ground finely between millstones like those used by millers.

Another member gave instances in which one kind of cement in ten minutes was stronger than others in 24 hours, but the quick-setting cement after a time deteriorated so as to become worthless, while the other grew stronger by age.

An inquiry was made as to experiments in transverse strains.

Mr. Morton said he had made no such tests.

It was stated that the English cements gave far better tests in this respect than any American brand.

Mr. Chesbrough said he had found sometimes that an inferior rejected cement, mixed with a good reliable brand, would result in an excellent quality. In fact he had never seen better than some made in this way.

Mr. Whittemore said he had tested cements from a dozen different layers in the same bank, and there were no two layers which mixed would not give a better result than any single layer.

The evening session of Wednesday was devoted to the reading of a paper on the

PROGRESS OF ENGINEERING IN AMERICA,

by Mr. O. Chanute, chief engineer of the Erie road. As the rules or practice of the society forbid the copying of papers in full by journals, we are forced to present this able paper and review of progress only as an abstract.

Man at the end of the eighteenth century, the paper began, was ceasing to utilize natural power in its larger and coarser forms. From the introduction of the steam engine the engineer has become a most important agent, and his art is well defined by Telford as the director of those great natural forces that contribute to the prosperity and welfare of nations. Time had been when other countries were compelled to send to Holland for hydraulic engineers to redeem marsh lands, but by the introduction of steam these primitive masters were soon exceeded in their science. In 1778 James Watt, after 20 years' struggle with a difficult problem, succeeded in originating the steam engine. It was a triumph which set men thinking, and the application of steam ensued in all its various branches. In 100 years more was accomplished for science and mechanism than during the ten previous centuries.

Allusion was then made to the wonderful growth of this country in all that pertained to engineering, and the high position the United States had attained among nations.

The system of supplying water to towns by means of water reservoirs was inaugurated by Hans Anderson, at Bethlehem, Pa.,

the water being conveyed to a wooden reservoir through hemlock logs. The idea was followed at Morristown.

The subject of application of steam to water works, as first made on the Schuylkill River, at Philadelphia, was then treated; also the improvements made in pumping machines, engineers having made a gain in this respect of 50 cent. over what was accomplished 20 years ago. Mr. Chesbrough, in laying his tunnel two miles under Lake Michigan for supplying Chicago with water, had accomplished a great engineering triumph. At present 569 towns in the United States and Canada were supplied with water reservoirs, with an average daily capacity of 12,000,000 gallons, employing 13,000 miles of pipe, 10,000 of which are of cast iron. A comparison was made between the primitive means of water supply and the present convenient means which supplies every portion of the household with hot and cold water.

The next subject treated upon in the address was that of canals. There are in this country 3257 miles of canal navigation, and about 500 miles have been abandoned. Steam has not yet been successfully applied to canal boats, although the Belgian system has been applied between Albany and Buffalo. The Nestor of American engineers, Mr. John B. Jeffries, a veteran of four-score years, has proposed to draw canal boats by locomotives running upon the banks on each side of the canal, but so far without practical success.

RAILWAYS.

The Americans were among the first to appreciate Stephenson's invention of the railroad in 1828, and were but little behind the English in utilizing it. A table taken from a manual by Mr. H. B. Poor shows that the number of miles of railroad are as follows: Europe, 90,000; United States, 86,000; balance of the world, 25,000. The percentage being: Europe, 45 per cent.; United States, 43 per cent.; balance, 12 per cent. The cost of construction in this country is $58,900 per mile, less than half that of Europe. Our engineers have introduced means that have proved cheap and efficient, and our engines pull heavier trains and make more miles in a year. The average made by an engine in Europe is 15,720 miles; in the United States, 21,900 miles per engine. While our engineers have given engines and cars greater freedom and ease of movement, the result of our sudden turns and steep grades, there are many things in engine construction, notably in boiler making, which might be utilized here with benefit. The Pennsylvania Railroad—if not the best, one of the best-managed roads in the world—has been at great expense in testing improvements, and the new freight cars being tried promise to surpass all others. Our engineers have done fine work in contributing to the safety of travel, *vide* the instances of the safety platforms, power brakes, &c., which improvements, notwithstanding the lightness of our roads, make travel here as safe as in Europe. The improvements in the matter of automatic signals are remarkable, and much more will be developed in their line. Sharp competition between lines has reduced the cost of transportation to as low rates as can be found elsewhere, and, notwithstanding the watering of stock process, a return of 3.93 is the average showing upon investments.

There are 3500 miles of horse railways in the United States, but this means of transit is very slow. In London the problem has been solved by underground roads. But the cost in this country would be $1,500,000 per mile. New York had successfully elevated roads on girders which are sustained by iron columns. These roads cost $300,000 per mile. A decided reduction is necessary to make rapid transit utilized in large cities, and a number of prominent engineers are studying the question.

BRIDGES.

Engineers are necessarily the bridge builders of the country. Iron and steel are now introduced into their construction with important success, and give the greatest efficiency at the smallest cost. There are now in the United States 900 miles of bridges. One-third of them are of stone and iron and two-thirds of wood, and these latter will have to be rebuilt by our engineers with the more durable material. Reference was made to the eye-bar and rivet in the construction of spans, and it was designated the great principle of success in iron bridge building. The chief defect in bridges is in the floor, and the less wood used on iron bridges the better it would be. The chief cause of accidents is by derailment of trains, and the tracks should be made as firm as possible. The question of material should not be forgotten, and he predicted that the day is not far distant when steel will be produced at less cost than iron is at present by the puddling process. It has been used in the bridge at Glasgow, at St. Louis, and is being used in the East River Bridge at New York.

RIVER IMPROVEMENTS

are attracting great attention at present, and the fact is being realized that but little has been done toward river improvements as yet. Within a few years we must make river works. It has been demonstrated that even in the Missouri River the current can be controlled by building brush dikes. [The writer here paid a warm compliment to Captain James B. Eads for his great achievement in constructing the jetties at a cost of $5,350,000, which answered the same purpose as the ship canal proposed, which would have cost $10,000,000. This was greeted with loud applause.] The improvement of the Mississippi by deepening its channel and narrowing its width in sundry places attracted much attention. The moveable dam on the Ohio has made success in its working. The idea was taken from the French, who originated it. We will improve upon it to suit the peculiar nature and requirements of our rivers.

The government has erected 626 lighthouses and 727 river lights. [Here followed a lengthy table of statistics on buoys, signals, &c.]

The removal of the obstructions at Hell Gate, in the East River, by General Newton was a great feat of engineering. A shaft was sunk in the solid rock, which was tunneled and honeycombed in every direction, and the 4427 apertures were exploded with 47,900 pounds of rock powder and dynamite, unsettling three acres of rock and sinking the channel of the river.

General Newton is now engaged in blowing up eight acres of a similar nature, known as Flood Rock. The holes are bored by drills driven by compressed air.

SHIPBUILDING.

The cause of decay of the maritime trade of this country is owing to the unequal competition with England in shipbuilding and the superiority of iron over wooden vessels. The change began to take place in 1857, and notwithstanding that Robert Fulton, an American, first applied steam to navigation, and the Savannah, an American steamer, was the first to cross the ocean, our vessels, for the reasons stated, gradually disappeared from the sea. The cost of construction in this country is much less than it was ten years ago, and there is certainly a great field open for marine engineers. By use of machinery they can overcome the difference in cost of construction and in time we can assume our proper place on the ocean.

TELEGRAPHIC ENGINEERING.

It is very difficult to get statistics on this subject. On Jan. 1 there were 119,042 miles of telegraph in operation and 299,250 miles of wire, not counting the district telegraphs, fire-alarms, &c., in use in the cities. The Western Union Telegraph Company sent in one year 25,070,000 messages.

The telephone when exhibited by Prof. Bell in 1876 was regarded as a toy. Now there are 121,000 instruments at work connecting our residences and business places so that we can talk with each other miles away.

GAS ENGINEERING.

In 1850 there were 50 gas companies in this country; to-day there are 900, with a capital of $200,000,000, and annually serving 20,000,000,000 cubic feet of gas, consuming 2,000,000 tons of coal. In competition with other illuminating agencies they have in Europe reduced the price of gas much below what it can be made for in America. Gas furnaces and other applications of gas were spoken of, and the subject of water gas touched upon. Time will show which is the cheapest of these processes.

METALLURGY.

The wonderful increase of blast furnaces in this country is notable. There are now in operation sufficient of these to turn out 6,500,000 tons of iron per year. In this we stand second, England being first and Germany third. Our steel industry is second in the world and in a year it will be first. The growth since 1878 has been 50 per cent., and at present enough to lay or relay 18,000 miles of railroad can be produced annually. Mining was then spoken of, and allusion was made to the enormous products of gold and silver in this country. Special reference was made to the Comstock lode in which the temperature was 103° F., and various appliances were necessary to prevent mortality to the miners. The discovery of petroleum and its importance was spoken of, and instances were cited wherein sinking artesian wells gas had been struck, which was utilized, the town of Freedonia, N. Y., being thus lighted by natural gas.

AGRICULTURAL ENGINEERING.

Before this branch all others became as the dust of the valley. In the plow alone wonderful improvements had been made, although in some of the older countries of Europe the same style of implement was in use as was used when the Saviour was born. In 1850 the New York Agricultural Association made trial tests, and found that in using the plow having the smallest draft, a saving of $8,400,000 was the result to the country per annum. Since that time the improvements have been so steady and important that a saving of $45,000,000 is made over that time; and yet the plow of the future has not been invented, and it will probably be propelled by steam. Here is a fine field for the engineer. Other inventions, such as shellers, cultivators, &c., were alluded to, and a special tribute was paid to the most wonderful of agricultural implements—the self-binder and reaper—with which a boy could work over from 15 to 20 acres per day, the saving being estimated at one-third of the value of the entire crop, or $100,000,000. The cotton crop of the South is now picked and worked by old methods, and here the engineer must direct his attention and study out new paths. He must break loose from the ruts he has been running in and pay attention to these important fields, not being a promoter of schemes or a tool for the use of the magnates of Wall street. The other topics treated upon were those of meat transportation and wood preservation. A high compliment was paid to Captain John Ericsson, and a prediction was advanced that air would be navigated in time with ease and safety. The paper closed with a comparison between American and English engineers, with some practical suggestions regarding the future gatherings, in order to draw out the full engineering talent of the country.

Wednesday's Excursions.

The excursions of Wednesday were to the City Water Works, the Vulcan Steel Works and Meier Iron Works (blast furnaces) by boat, and the return to the city by rail from the latter place. The St. Louis Water Works are exceedingly interesting. The water is pumped from the Mississippi River below its junction with the Missouri. All the sediment which has given the latter river its title of the Big Muddy goes with the water into four large basins 600 by 270 feet. In these basins the water is allowed to settle for 24 to 36 hours, and is then pumped out to supply the city. It had been so arranged that the different processes of filling in, pumping out, settling and cleaning were in active operation. A shovel of mud from the bottom of the basin undergoing the process of cleaning attracted much attention, as it showed very plainly the result of each day's settling. Sixteen inches of solid mud in four months was the result in the bottom of the basin. One was full of water standing to be cleared of sediment. Another, from which the water was being drawn off, was half empty. A huge stream of water from the pumps was rushing in to fill the third, while the fourth was empty of water, its bottom showing a broad expanse of mud, which a gang of laborers were busy cleaning out. The laborers cut a channel through and then keep a stream of water, fed by a syphon from an adjoining basin, running close against the edge of the bank. Each has an implement similar to that ordinarily used in cleaning stables, made of a piece of board 2 feet long and 7 or 8 inches wide with a long handle fixed in the center of it. The men chop out and loosen great chunks of the mud and push them along with the stream till the slushy mass reaches the outlet sewer and is swept into the river. The daily consumption of St. Louis averages 25,000,000 gallons of water and what sand is left in it. A very interesting profile was given the visitors, showing the actual average consumption of water for each of the 24 hours the year round.

THE VULCAN STEEL WORKS

showed to those who had known it previously the admirable results of the efficient management of Mr. W. P. Shinn. Order was being evoked out of chaos. The make of steel rapidly increased, reaching as a daily minimum 200 tons, and the promises of the future success of this works seems excellent.

THE MEIER FURNACES

on the Illinois side of the river were built several years ago, and were intended to be the furnaces of the country. They were never put in blast, however, until 1880, and the wonderful improvements of the past four years have left them far behind. They are not doing the work they should.

INDUSTRIAL ITEMS.

MASSACHUSETTS.

The Hopedale Machine Company and the Hopedale Furnace Company, of Milford have consolidated. An addition, 40 by 66 feet, has been put on their machine shop, and the foundry has also been enlarged.

The Northampton Emery Wheel Company have bought a large grind stone quarry in Illinois.

PENNSYLVANIA.

It is stated that a stock company has been formed, with a capital of $300,000, which will build extensive machine shops in Pottsville.

The Union charcoal furnace, belonging to Daniel B. Fisher, of Leesport, more commonly known as the Windsor Furnace, situated on the Blue Mountain, 3 miles northeast of Hamburg, has been compelled to go out of blast in consequence of the destruction of the engine house, boiler house, and blowing apparatus by fire on Saturday last. The loss amounted to about $3000. There was no insurance on the buildings destroyed. The fire originated from sparks from the furnace stack. The water wheel destroyed was one of the largest in the State of Pennsylvania. It will take four weeks or more to get the furnace in blast. Mr. Fisher has made arrangements for the immediate rebuilding of the buildings destroyed.

The Rockland Furnace, formerly known as the Sally Ann Furnace, near Bower's Station, went into blast on Thursday, the 27th, the damages caused by the burning of the engine house having been repaired.

Emaus Furnace has suspended work on account of the trouble of the P. & R. I. & C. Co. The furnace is in the hands of the company.

Messrs. P. L. Weimer & Bro., Lebanon, who have a contract for building cars for the Reading Railroad, have suspended work on the cars and discharged a number of their hands.

The Baldwin Locomotive Works, at which several engines are now being built for the Reading Railroad, are at present employing over 2700 men, and are running on overtime.

The hoisting apparatus of No. 4 stack, Allentown Iron Company, was discovered to be on fire last week, and was much damaged. The loss will amount to several hundred dollars. The fire will not prevent the furnace from being operated, as it will be filled from No. 3 stack. The damage will be repaired in a few days.

The Palo Alto Rolling Mill, which was leased from the Haywood estate by the Coal and Iron Company a year ago, will, in all probability, close its doors on Saturday night, the lease having expired and business having a black eye. This step was decided on before the suspension of the P. & R.—*Pottsville Chronicle of May 28.*

Rutter, Newhall & Co., of Philadelphia, who had suspended, owing to the failure of the Philadelphia and Reading Railroad Company and Philadelphia and Reading Coal and Iron Company, have made a settlement and resumed business.

The Phœnix Iron Company's mill, at Norristown, has ceased work temporarily, and it is uncertain when it will be restarted. Report says that the measure is a prudential one merely on the part of the company, who desire to avoid all unnecessary expense until the results of the Reading Railroad Company's suspension are developed.

The puddle department of J. H. Boone & Co.'s Stony Creek rolling mill, near Norristown, which has been lying idle for several weeks past, was to have resumed operations on the double turn on Monday morning, the 31st ult., with a fair prospect of running steadily. A number of improvements have been made in this mill while it has been standing idle.

Douglas Furnace No. 1, at Sharpsville, has been "banked up" for an indefinite time. This leaves only two furnaces in blast —Spearman No. 1 and the Mabel.

Joseph T. Potts, the recent purchaser of the Isabella Furnace, has already received several car loads of charcoal from Virginia. He is having a new hearth put in, besides other improvements preparatory to putting the furnace in blast.

The work of remodeling Swede Furnace below Norristown, has been suspended in consequence of the suspension of the Reading Railroad Company. Considerable material is lying about the premises, which, if not used will likely be ruined. The stoppage of repairs was not relished by the laborers in the neighborhood.

VIRGINIA.

The proprietors of the manganese works in Augusta County, last week mined, washed and shipped to England 100 tons of manganese. The company now employs from 75 to 100 hands, runs two saw mills, two washers driven by steam, and keeps in employment from 10 to 12 teams.—*Staunton Valley Virginian.*

OHIO.

Bloom Furnace, hot-blast, blew in last Thursday. The furnace and property are in better condition than ever before. Clare, Amos & Co. are proprietors, and W. C. Amos, of Ironton, is manager.—*Portsmouth Times.*

Russell & Co., of Masillon, are working 325 men, and are compelled to run over hours to keep pace with orders. They are turning out seven engines and 36 thrashing machines per week.

The Lawrence Mill at Ironton is running single turn and reports a little better prospect. Inquiries are coming in more numerously.

Messrs. Hanna, Rhodes & Chapin have erected in Cleveland a manufactory of bolts and nuts. They will manufacture a full line of carriage, tire, spring, plow and agricultural bolts, also machine and cap screws, making a specialty of fine Philadelphia bolts. The works, to be known as the Chapin Bolt and Nut Works, will turn out 175,000 per day.

The Cherry Valley Iron Company, of Leetonia, have just completed the laying of an 8-inch cast-iron pipe from their furnace to their rolling mill, a distance of 300 yards, through which to convey steam to operate the machinery of the latter.

Andrews & Hitchcock's Furnace No. 1, at Hubbard, which has been damped down for some time and undergoing repairs, resumed operations some days ago.

KENTUCKY.

The Kenton Furnace was to have started on the 1st of June to make a blast of 3000 tons.

The Center Furnace, Lyon County, is now in full blast, turning out from 12 to 15 tons of iron daily, and has a contract for all the iron it can manufacture this season at $36 per ton.

The Hunnewell Furnace is now receiving 27 loads of charcoal per day, and will increase this quantity to 30 loads by the end of this week, which is certainly doing things on a pretty large scale. The furnace is now making 18 tons of strictly No. 1 foundry iron per day.

TENNESSEE.

The Knoxville Car Wheel Co. are running their blast furnace in Carter County, and are building a second stack, which will be finished by July.

CHATTANOOGA, May 29.—By fiat of the Chancery Court of Hamilton County, on a general creditors' bill filed by the shareholders of the company, the Vulcan Iron and Nail Works were to-day thrown into bankruptcy under the laws of Tennessee, and James C. Warner, of Nashville, was appointed receiver. The best information obtainable is that the liabilities are $362,000, and the assets available about $200,000. The Vulcan Works had the largest nail, bolt, spike and bar mill in the South, and employed about 600 hands. The capacity of the mill was 40 tons daily, half of which was in nails. The receiver is directed to continue operating the mill as long as he does not impair the assets. A large portion of the liabilities are held by business men of Chattanooga. The failure causes much excitement here. The cause assigned for the failure is the shrinkage in iron, a large stock of which was on hand.

INDIANA.

The Nelson Iron and Coal Company, a new organization, has put in blast the furnace at Shoals, which has been idle for several years.

ILLINOIS.

The fires were started in the blast furnace of the Joliet Iron and Steel Company on Tuesday, the 25th ult. The furnaces had been idle for over a year.

It is reported that a new company will shortly be formed in Chicago, with a capital stock of $150,000 for the manufacture of a new patent post for barb-wire fence. Several large firms of that city are interested in the project.

The Chicago Axle and Forge Works, W. H. Cunningham, proprietor, are running full time employing a large number of men, and turning out car-axles, engines and mill shafting for the railroads of the West. They are in receipt of orders from Iowa, Nebraska and for southwestern railroads.

A new corporation called the Duffy Tool Company, with a capital of $50,000, have purchased the grounds, buildings and machinery of the old Chicago Steel Company, at South Chicago, where they will manufacture tools, hardware and crucible steel. The new enterprise was to commence operations June 1. Among the members of the company are such well-known business men and capitalists as Francis W. Newland, A. D. Lamb, Hon. John L. Burleigh, James F. Duffy and James Mooney, of New York.

The Vulcan Iron Works, of Chicago, are just completing a car pile-driver for the St. Paul, Minneapolis and Manitoba Railroad Company, to be used for railroad pile-driving along the line of the above road, with a 20,000-pound hammer. This firm are also manufacturing a Loomis patent steam hammer for the Chicago Dredging and Dock Company and a Skinner patent hammer for O. B. Green. They are employing 75 hands and running overtime.

The Union Foundry Works, corner Fifteenth and Dearborn streets, have shut down work. The Chicago and Western Indiana Railroad Company will build its tracks this summer on the grounds where the above foundry and works were established and run since 1853. It was one of Chicago's largest and oldest workshops. Some hundred hands found work here the year round. The firm made a specialty of architectural ironwork, and their iron column store fronts can be seen in almost any large city. Just at present there seems to be some doubt whether they will resume work or not. If they should, new works will have to be erected in some other part of the city. —*Chicago Industrial World.*

SCIENTIFIC AND TECHNICAL.

A property which has hitherto by many been considered peculiar to ice, and of great importance in explaining the action and movements of glaciers, is

REGELATION.

Ice, it is true, appears to possess this property in a high degree, and the following experiment beautifully shows it: Lay a bar of ice horizontally upon two bearings at its ends; then place a thin wire upon the middle of the bar and hang a weight to it. The wire will in time cut its way through the bar and come out at the under side without leaving a trace of its path. There is every reason to believe that other bodies possess this same property, though in a lesser degree. An examination of the method employed in the manufacture of lead pipe will prove that there also regelation plays an important part. In its manufacture a strong iron cylinder is fixed with its axis in a vertical position. A ram works in it underneath, and there is a hole in the upper end of the cylinder for receiving a die. The die is made of such a size as to give the required diameter to the lead pipe. The ram is lowered and the cylinder is filled with melted lead. The lead radiates its heat through the cylinder, but in order that it may not cool down below a certain temperature, a fire is kept burning around and in contact with the cylinder. When the lead is cooled down to a little below its point of solidification, and is "set," as it is technically called, pressure is applied to the ram and the lead is forced through the die. If the pressure be applied before the lead is sufficiently cooled, or before it is "set," a jet of liquid metal is thrown up and a splash of lead is left on the ceiling above the cylinder, as evidence that that part of the operation was begun too soon.

The die is made of annular form by the insertion of a steel core in the center of the hole. But this core has to be held in position. This is done by a bar across both the core and the die inside the cylinder, so that the core cannot be forced out through the die. The lead in its passage from the cylinder has to move round this bar; for the bar acts somewhat like an island in the middle of a river, or like an island in the middle of a glacier; it cuts the stream into two halves. How are these two streams of lead to join each other so as to make a pipe? We have seen that if the lead be liquid, a jet is thrown up, and instead of forming a pipe, falls as an unpleasant shower upon the workmen. If the lead were solid, its ductility would enable it to be forced through the die in the form of two half-cylinders; but ductility would not join the two halves together. How, then, is the joining effected? There is no way of doing it except by regelation; and that regelation does really take place appears clear when the conditions of the operation are examined. It appears that the lead is forced against the die with a pressure which slightly lowers its melting point; and, as the pressure overcomes a viscous resistance, heat is generated in the lead, thus slightly raising its already high temperature; these two causes acting together melt a portion of the lead. Then, before the lead gets quite through the die, the resistance diminishes; therefore the pressure diminishes, and as the pressure diminishes the melting point returns to its normal hight; meanwhile that portion of the lead which is escaping the pressure is coming nearer to the external air; its temperature is therefore being lowered, because its heat is radiated more rapidly; these two causes acting together solidify the lead—that is, regele the lead, and complete the formation of the pipe. In this way a lead pipe is formed by regelation.

Dr. Henry A. Mott, well known in connection with numerous investigations into the purity of various articles of food and other chemical researches, has just published a report on

HEVEENOID,

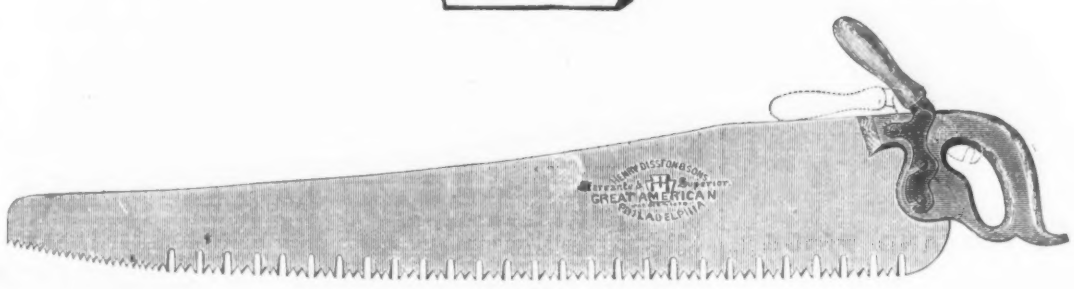
a new product, which, it is claimed, is destined to supplant the hard and vulcanized India rubber. The process of manufacturing heveenoid, which is the invention of Mr. Henry Gerner, is thus described by Dr. Mott: Pure India rubber, whether it be Para, Nicaragua, Madagascar or African, is first boiled in water, after which it is passed between rollers, one of which is ridged; a stream of cold water is allowed to flow over it, when it is torn in all directions, the water washing out the sand and other foreign impurities. It is next hung up to dry in a room the temperature of which is 120° to 150° F., and left there for five to six days, when it is in a condition to be baked on rollers, the object of which is to make the rubber more homogeneous, after which it is rolled up and laid away for use. The next stage in the manufacture is the incorporation of the other constituents with the rubber thus prepared. The principal constituents to be incorporated are camphor and sulphur. These two substances are usually united before combining them with the rubber, and there are several processes to bring about their union. The camphor may be melted and then poured on the sulphur, or both may be melted together, the two substances being thoroughly stirred and then allowed to cool, when it may be ground and reduced to powder, which latter process is facilitated by moistening the mixture with either alcohol, naphtha, gasoline or benzine. This powder is then in a condition to mix with the rubber. The camphor could be dissolved in some menstrua, such as alcohol, naphtha, &c., and then poured on sulphur and such other substances as are to be incorporated with the mixture, the whole being thoroughly stirred, when the solution may be evaporated and the product ground to a powder as above. Another method which has proved very practicable is to mix the camphor and sulphur thoroughly under rollers, after which it may be ground in an ordinary grinding mill. The powder prepared by one of the above processes is next directly incorporated with the prepared rubber which was laid away for use. The rubber is passed between rollers, one of which is run somewhat faster than the other, and as one roller is hotter than the other, the rubber naturally adheres to that roller.

(*Continued on page 20.*)

HENRY DISSTON & SONS,

KEYSTONE SAW, TOOL, TRADE MARK STEEL & FILE WORKS,

Front & Laurel Sts., PHILADELPHIA.



We desire to call attention to our IMPROVED HANDLES FOR ONE-MAN CROSS-CUT SAWS. The above cut shows the Handle attached to the Saw. We claim the following as some of its advantages: The hands are brought into an easy position when working, securing power without much exertion; they are strong and durable, both handles being held to their places by three iron bolts; the handle can be slightly adjusted, giving it more or less angle, to suit the operator.

When packing for shipment, loosen the screws a little and the projecting handle can then be placed on a line with the back, as shown by dotted lines. We claim that these handles are the best in the market, and they perfect a principle which heretofore had not been accomplished.

HISCOX FILE MANUFACTURING COMPANY,

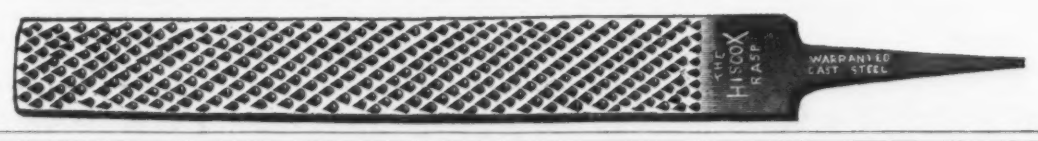
West Chelmsford, Mass.

Every File and Rasp of this Manufacture sold by

Hardware Dealers, or from the Works Direct,

IS WARRANTED EQUAL TO ANY FILE MADE.

If not found to be satisfactory, the money will be refunded upon application.



100 RESPONSIBLE WATCHMEN

Furnished for Watching Pig, Scrap, Old Rails, &c.

BY

VAN HOESEN & BRO.,

Established 30 Years. 67 South Street, near Pine, New York.

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Creasey's Ice Breaker

Patented October 29, 1878.

The Simplest, Cheapest and Best Ice Breaker ever offered to the Public.

Manufactured and Sold by

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for Albert Smith & Co.'s Wrought Iron Pipe; Coxsackie Malleable Iron Co.'s Gas, Steam and Water Pipe fittings; J. B. Hoyt & Co.'s Standard Belting; J. & Riley Carr's English Steel and "Dog Brand" Files and Rasps; Elliott & Co.'s Set and Cap Screws and Taps; Crockford's Patent Ratchet Brace; Alden's Pure Turkish Emery; Howe's Double and Triple Acting Force Pumps.

Send for Catalogue and Price List.

10,000 Sold the First Year.

THE BEST ADJUSTABLE BAG HOLDER

In the World.

PRICE ONLY $1.50.

Sent free, on receipt of the price, anywhere in the United States.

It is made of iron, will fit any sack, wide or narrow, and will last a lifetime. Sold by Hardware and Agricultural Implement dealers everywhere. A large discount to the trade and agents. Your orders respectfully solicited, and agents wanted for this best selling article in the market.

Address,

L. JEFF. SPRENGLE,

Sole Manufacturer,

Ashland, Ohio.

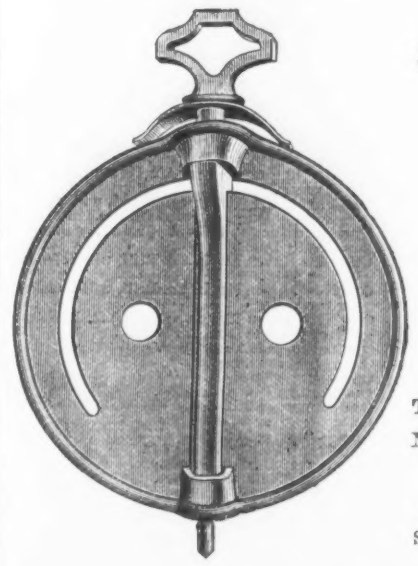
Who would do with out it for $1.50.

The platform does not go with the holder; it is extra if wanted.

"ECLIPSE"

STOVE PIPE DAMPER.

THE BEST YET MADE.



SIMPLE, DURABLE, CERTAIN IN OPERATION.

Cannot get out of order. Only Three Pieces. No Breakage. Nickeled or Wood Handle.

Liberal discount to the wholesale trade. Samples free. Apply for price to the

DETROIT IRON AND BRASS MFG. CO.,

HOLLOW-WARE FOUNDERS,

DETROIT, MICH.

BE SURE YOU SEE THIS DAMPER BEFORE PURCHASING FOR FALL TRADE.

PATENT "SCREW WINDOW BALANCES."

AN ADJUSTABLE SUBSTITUTE FOR SASH WEIGHTS.

FULLY RECOMMENDED ON THEIR MERITS.

Proved by Two Years' Constant Service.

Invaluable for windows without weights. They automatically balance sash at any point opened until assisted in their further ascent or descent by the hand, precisely as when weights are employed.

By doing the whole work within themselves all complications are avoided, and at a cost, applied, of less than one-half that of applied weights, with their boxings, cords, pulleys, hangings, adjustings, &c., &c.

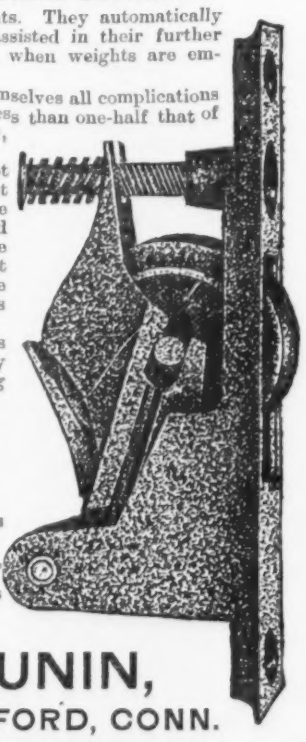
When applied are out of sight. Are not touched in working the sashes. Cannot get out of order. Are as easily applied as the sash pulley. Are instantly adjustable and readjustable without removing them or the sashes, and their use, while giving the best working sash, puts an end to the annoyance and continuous expense of keeping sashes hung with weights in working order.

This extremely useful invention meets with favor wherever used, when properly applied. Refer to the following houses using and selling these goods:

R. R. THOMAS & CO., Philadelphia, Pa.
BUTLER & HUNTTING, New York.
CROCKER MFG. CO., Holyoke, Mass.
ALTOONA HARDWARE CO., Altoona, Pa.
J. B. HAMMOND, Washington, D. C.

and to hundreds of other users and dealers in these goods upon application.

Retail price, 12 to 20 lb. sashes (4 balances), $1.00 per window.
Retail price, 12 lb. and under (2 balances), 50 cents per window.
Discounts to the trade. Address



ROB'T B. HUGUNIN,

Sole Maker Screw Balances. HARTFORD, CONN.

CLARK'S PATENT

HAIR CUTTING MACHINE.

This machine is warranted to make a clean cut, is easy in its operation, and has been before the public for many years, giving the highest satisfaction to all who use it.

To be obtained wholesale from

MESSRS. MOSEMAN & BRO.,
128 Chambers St., New York.

Messrs. J. HAMBLETON & SON,
221 Spruce St., Philadelphia, Pa.

Messrs. FIELD, LEITER & CO.,
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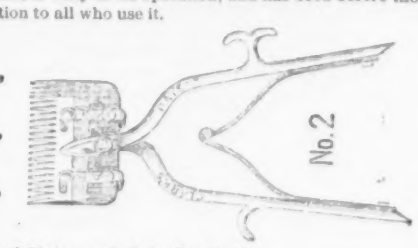


And all Merchants in the United States, and of the Patentee,

W. CLARK, 232 Oxford Street, London.

AGENTS WANTED.

THE SECURITY BLIND FAST CO.,

Manufacturers of

PAT. BLIND FASTS, WROUGHT IRON BLIND HINGES, WINDOW SPRINGS

Contracts for Hardware Specialties (wrought and malleable iron) executed promptly. Correspondence solicited with and estimates furnished to responsible parties.

19 Calender Street, Providence, R. I.

(*Continued from page 17.*)

During its revolution the constituents to be added, in a powdered condition, are fed through a hopper placed over the rollers; the rubber is from time to time introduced in mass between them; by doing this, the constituents are thoroughly intermixed throughout the whole mass. A complete "batch," incorporating all the constituents, can be made in from 15 to 30 minutes. Each "batch" is now pressed between calendar rollers, such as are used in the ordinary working of rubber, and need not be further alluded to. The "batch" then passes from the rollers on to a drum placed in front of it, when the rollers on top of the drum force out any air globules which might have been entangled in the product during the mixing process. From the drum the "batch" passes off in a continuous sheet and is deposited on flat cloth tables placed in front of the drum, the cloth being an endless cloth and carrying the sheets forward their whole length. These sheets are cut any desired length and are pressed between sheets of tin, when they are ready to be put into the vulcanizer. If the proportion of constituents is right for hard heveenoid, they are laid in cars which run on a track inside of the vulcanizer, sheets of paper are put between each layer, and the whole is covered with water to about 6 inches above the top layer. When the car has been moved into the vulcanizer, and the latter securely sealed, live steam is turned in, and left on for four and a-half to five hours, when the product will be found completely vulcanized. Thirteen hours are required to vulcanize hard rubber by the old process, hence the saving of time is considerable. To make soft heveenoid, the sheets of the homogenous mixture are pressed, as in the previous case, between sheets of tin, or pressed in molds which are afterward put in the vulcanizer and covered with soapstone. When the vulcanizer is closed it is heated by dry heat to about 312° F., and kept at this temperature for about 45 minutes. If the product when taken out cannot be impressed by the nail it may be considered sufficiently vulcanized.

The proportions of the constituents to make a soft and hard heveenoid may be approximately given as follows:

	Soft Heveenoid.	Hard Heveenoid.
Rubber	2 parts,	3 parts.
Camphor	2 parts.	2 parts.
Lime	1-16 parts.	....
Glycerine	....	½ parts.
Sulphur	¼ parts.	8 parts.

Para is best for hard heveenoid, while Nicaragua rubber answers very well for soft heveenoid, and, in fact, is somewhat better adapted.

The main advantages claimed for heveenoid are that the large amount of sulphur is chemically combined, forming a sulphide of camphenes, and that, therefore, the drawbacks attending the presence of considerable amounts of sulphur, mechanically mixed, as with ordinary vulcanized rubber, are avoided. While from 30 to 50 per cent. cheaper, it is claimed, that it is fully equal in its valuable qualities to the purest rubber, and that in many respects it is superior to it.

The "Economic" Feed Pump.—The various appliances used for supplying steam boilers with water may be ranged in three classes, power pumps, or those driven by a belt, steam pumps and injectors. Each system may be said to possess merits of its own which will recommend it for use under certain circumstances. Power pumps are generally admitted to be more economical than the steam pumps, and it is with a view to gaining the full benefit of this advantage that Mr. J. B. Davis, of Hartford, Conn., has recently designed a new style of pump which has been given the name "Economic." It is a geared plunger pump, which, being double acting, has a smooth action, and to render the latter more regular still, Mr. Davis uses cut iron patterns for his gearing. It is compact in design, and yet the parts requiring repairs most frequently, the valves, which suffer most with muddy or sandy water, are easily accessible. They are got at readily by simply unscrewing a brass cap. The valves can be ground tight quickly whenever they have been cut by sand, &c., and the pump is, therefore, recommended for sandy water; and as special attention has been given in designing and constructing it, to make it serviceable for hot water also, it is adapted for use under most of the circumstances under which this class of machinery is called upon to work.

Trade Report.

Office of The Iron Age,
Wednesday Evening, June 2, 1880.

In the financial markets during the past week there has been a further depression in the prices of speculative securities and shares.

The rate for call loans in the money market has been 3 @ 4 %, with loans as low as 2 %.

Government bonds have been firm. The proposals to the sinking fund, opened to-day, amounted to $10,894,600. Of these $3,000,000 were accepted.

Railroad investments have been strong, but speculative bonds were lower. The principal dealings have been in Lake Shore, Western Union Telegraph, Erie, Northwest, Milwaukee, St. Paul, and Pacific Mail.

The bank return shows a gain of $2,208,475 in surplus reserve, which now stands at $16,128,450, against $4,138,300 at this time last year, and $14,282,225 at the corresponding period in 1878. The loans show a gain this week of $965,600, the specie is up $2,439,800, the legal tenders are increased $877,900, the deposits other than United States are up $4,436,900, and the circulation is decreased $65,900.

The following is an analysis of the bank totals of this week compared with that of last week:

	May 22.	May 29.	Comparisons.	
Loans	$272,250,800	$273,216,400	Inc.	$965,600
Specie	56,831,900	59,271,700	Inc.	2,439,800
Legal t'nd'rs	21,669,500	22,547,400	Inc.	877,900
Tot. reserve.	78,501,400	81,819,100	Inc.	3,317,700
Deposits	258,325,700	262,762,600	Inc.	4,436,900
Reserve required	64,581,425	65,690,650	Inc.	1,109,225
Surplus	13,919,975	16,128,450	Inc.	2,208,475
Circulation	20,304,000	20,268,100	Dec.	65,900

The foreign trade movements at the port of New York since our last issue are shown in the following tables:

IMPORTS

For the week ended May 29:

	1878.	1879.	1880.
Dry goods	$846,949	$1,019,354	$1,815,908
General mdse.	3,413,583	4,424,475	8,136,589
Total for week.	$4,260,532	$5,443,829	$9,982,497
Prev. reported	112,722,137	120,847,902	201,762,467
Since Jan. 1	$116,982,669	$126,291,731	$211,744,964

Included in the imports were items of merchandise valued as follows:

	Quantity.	Value.
Anvils	163	$1,800
Brass goods	21	3,171
Bronzes	14	2,461
Chains and anchors	48	2,676
Copper		4,519
Cutlery	93	28,908
Pins	13	1,771
Gas fixtures	2	356
Guns	67	18,082
Hardware	74	5,138
Iron, hoop, tons	210	10,129
Iron, pig, tons	20,182	416,425
Iron, sheet, tons	171	10,238
Railroad bars	58,184	483,349
Iron ore, tons	3,082	10,069
Iron, other, tons	18,491	551,685
Lead, pigs	2,236	12,024
Lead, pgs	78	82
Metal goods	166	18,040
Nails	19	3,037
Needles	27	9,804
Nickel	25	3,748
Old metal		18,016
Percussion caps	4	831
Saddlery	29	5,065
Steel	33,329	188,458
Spelter	385,982	18,893
Silverware	5	470
Tin, bxs	26,362	169,623
Tin, 6087 slabs; 507,236 lbs.		109,561
Wire	4,850	37,340

EXPORTS, EXCLUSIVE OF SPECIE.

For the week ended June 2:

	1878.	1879.	1880.
For the week	$6,665,896	$5,372,627	$8,042,822
Prev. reported	133,702,070	121,124,235	142,659,603
Since Jan. 1	$140,367,966	$126,496,862	$150,702,425

EXPORTS OF SPECIE.

For week ended May 29:

Total for the week	$141,489
Previously reported	3,472,967
Total since January 1, 1880	$3,614,456

Government bonds at the close were quoted as follows:

	Bid.	Asked.
U. S. 6's 1880 registered	101½	101¾
U. S. 5's 1880 coupon	104½	104¾
U. S. 6's 1881 registered	103½	103¾
U. S. 6's 1881 coupon	106½	106¾
U. S. 5's 1881 registered	103	103¼
U. S. 5's 1881 coupon	103	103¼
U. S. 4½'s 1891 registered	109½	109¾
U. S. 4½'s 1891 coupon	109½	109¾
U. S. 4's 1907 registered	107⅞	108⅛
U. S. 4's 1907 coupon	108⅞	109⅛
U. S. Currency 6's 1895	123	—
U. S. Currency 6s 1896	123¼	—
U. S. Currency 6s 1897	123⅝	—
U. S. Currency 6s 1898	124	—
U. S. Currency 6s 1899	124	—

The following were the closing quotations of active shares:

	Bid.	Asked.
Alton and Terre Haute	13½	18
" Pref	—	60
American District Telegraph	72½	75
Atlantic and Pacific Telegraph	35½	38
Burlington and Quincy	113¾	113¾
Bur., Cedar Rapids & North	54	60
Canada Southern	54	54½
Central Arizona	5	6
Caribou	2	3
Col., Chicago and Indiana Central	11¾	12¼
Clev., Col., Cin. and Indianapolis	65½	66½
Climax	2⅜	2½
Chicago, St. Paul and Minn	—	47¾
Chicago and Alton	106	107
" " Pref	122	125
Chesapeake and Ohio	15¾	16
" " 1st Pref	20	25
" " 2d Pref	16¼	19
Central Pacific	63	65
Delaware, Lack. and Western	73½	73⅝
Delaware & Hudson Canal	66½	67
Express—Adams	109	111
" American	54	56
" United States	44	46
" Wells, Fargo & Co	104	106
Erie	31¼	31⅞
" Pref	50	—
Excelsior Mining	16	17
Hannibal and St. Joseph	25⅛	25¼
" " Pref	67¾	68
Homestake	—	30
Houston and Texas	55	60
Illinois Central	100½	101½
Kansas and Texas	29⅛	29⅜
Keokuk and Des Moines	7	15
" " Pref	20	—
Lake Shore	96⅛	96¼
Lake Erie and Western	21⅛	22
Little Pittsburgh	6	6¼
Louisville and Nashville	125	—
Mariette and Cincinnati Pref	7¾	8¾
" " 2d Pref	5¼	5¾
Metropolitan Elevated	94½	95
Michigan Central	78½	79⅜
Morris and Essex	107	108
Mobile and Ohio	13	15½
Manhattan Railway	27¼	27½
Nashville and Chattanooga	50½	51
New York Elevated	113¼	115
New York Central	124⅛	124¼
Northwest	89¼	89½
" Pref	107¼	107¾
Northern Pacific	23½	23¾
" " Pref	44⅝	45
Ohio and Mississippi	25	25⅛
" " Pref	68½	71
Ohio Central	15	17
Ontario Silver	32½	34
Ontario and Western	24¼	24½
Pacific Mail	33⅛	33¼
Quicksilver	9	10
" Pref	—	53
Reading	21	21¼
Rock Island and Pacific	189	191
Silver Cliff	3¾	4
St. Louis and Iron Mountain	37¼	37¾
St. Louis and San Francisco	31	32
" " Pref	42½	43
" " 1st Pref.	62	—
St. Paul	70	70⅛
" Pref	99⅞	100¼
St. Paul and Sioux City	36	37½
" " Preferred	71	72
Standard	26½	27
Sutro Tunnel	2⅛	2¼
Union Pacific	85	85½
Wabash and Pacific	30	30¼
" " Pref	56	56⅛
Western Union Telegraph	88¼	88½

GENERAL HARDWARE.

We cannot report any improvement in the volume of business. The orders which are coming forward are mostly of a sorting-up nature, due in a great measure to a lack of confidence in the ability of the trade to maintain the prices established early in the year, when the values of metals were much higher than they are at present.

The manufacturers of Augers and Bits held a meeting at the Astor House in this city to-day, at which the existing prices were confirmed.

The Lock manufacturers held a two-days' session at Manhattan Beach, and adjourned this evening without taking any action in regard to prices.

The manufacturers of Cast Butts reduced their prices on the 1st inst. We print below the revised discounts of P. & F. Corbin and Carr, Crawley & Devlin.

New York, June 1, 1880.

We this day make the following changes on Cast Iron Butts:

Nos.	Dis. Per cent.
40 and 41, Plain without Acorn	35&10
42 and 42½, Plain with Acorn	30&10
43 and 43½, Japanned with Tips	40&10
44 and 44½, Japanned with Silver Tips	40&10
52, Loose Pin, Common Iron	35
53, Loose Pin, Japanned Iron	40
54, Loose Pin, Japanned Iron, Silver Tip	40
19½, L. J. Parliament	35

All the above subject to 10 per cent. cash, 30 days.

P. & F. Corbin.

Philadelphia, June 1, 1880.

CAST BUTTS.

From this date our discounts on Butts will be as follows:

Page of 1880 Catalogue.	Discount Per cent.
2, Bronze Metal Butts, No. 106	60
3, Bronzed Butts, No. 100	60
4, Loose Pin, No. 53	60
5, " No. 30	40
6, " No. 16	35
6, " No. 17	40
7, " No. 15	40
8, Narrow Fast, Drilled, No. 65	20
9, " Loose, " No. 70	35&10
10, Broad Fast, " No. 75	30
11, " Loose, " No. 80	35&10
12, Mayer's Hinges, Drilled	35
13, Parliament Hinges, Drilled, No. 90	35

Extra discount as heretofore.

Carr, Crawley & Devlin.

In addition to the discounts mentioned above, an extra discount of 10 per cent. for cash in 30 days is allowed.

On the 1st inst. Burden's Horse Shoes were reduced to $4.25 per keg, and Mule Shoes to $5.25 per keg, f. o. b., Troy, N. Y. The price from store in this city is $4.37½ and $5.37½ per keg, respectively.

The Rhode Island Horse Shoe Company have issued the following circular:

[*Circular No. 1.*]

OFFICE OF THE RHODE ISLAND HORSE SHOE CO.,
Manufacturers of Horse, Mule and Snow Shoes of the Perkins Pattern, at Valley Falls, R. I., and Black Rock, Buffalo, N. Y.

Providence, R. I., June 1, 1880.

To the Trade.—The present prices for Shoes of our manufacture are as follows, viz.:

	Cts. per lb.
Perkins Light, Medium and Heavy Pattern Horse Shoes	4¼
Perkins Pattern Snow, Road or Trotting Shoes	4¾
Perkins Pattern Mule Shoes	5¼
o and oo Mule Shoes	5¾
Jack Shoes	6¼

Free on board cars at the works at Valley Falls, R. I., or Black Rock, Buffalo, N. Y.

Snow, o and oo Mule, and Jack Shoes will be shipped from Valley Falls only.

A specification of sizes will be required when orders are accepted. Shipments will be promptly made in their turn. Terms of payment, cash in 30 days from date of invoice. If unpaid, subject to sight draft without notice. We reserve the right to decline orders; also to advance prices at any time, except upon contracts made prior to such advance. Strikes of operatives, or suspension in case of fire, will relieve us from prompt fulfillment of contracts. Shoes assorted as required.

Messrs. Durrie & McCarty, 97 Chambers and 81 Reade streets, New York, will continue to act as our agents, and they are authorized to sell at all times at our lowest factory prices. A full assortment of our Shoes we propose to keep in their store, ready for immediate delivery.

Rhode Island Horse Shoe Co.,
F. W. Carpenter, President.

The demand for Nails is fair for small lots, and we hear of an improved inquiry for large parcels, although no heavy transactions are reported. The market seems to be steady at $3 @ $3.10, net, for 10d., according to quantity.

We have received the following:

New Haven, Conn., May 28, 1880.

Gentlemen: At a meeting of the Carriage Hardware Manufacturers' Association, held in this city on the 27th inst., nearly all the prominent houses in the country being present, it was

Voted, That no change in prices be made until further notice.

Attest: R. P. Cowles, Sec'y.

The E. D. Clapp Mfg. Co. have reduced their prices for "Derby" and "Cincinnati" Fifth Wheels. Their revised prices will be found in their circular, which we print below:

Auburn, N. Y., June 1, 1880.

Dear Sir.—We this day reduce the prices of our Derby and Cincinnati Fifth Wheels 75 cents per dozen. The following are our present prices. Terms, net 30 days:

Catalogue Page.			⅝	¾	⅞	1 in. iron.
14, No. 1,	Derby Ptn.,	Per dz.	$7.75	8.75	14.00	20.00
15, No. 2,	" "	"	7.50	8.50	13.00	19.00
15, No. 3,	Cincinnati	"	5.50	6.50	11.00	17.00
15, No. 4,	" "	"	5.50	6.50	.....	.....
16, No. 5,	....	"	9.50	10.50	14.50	.....
16, No. 6,	....	"	8.50	.....	.....	.....

Add for Flat Center Spots 50 cents per dozen.

We hope this reduction in prices may induce your liberal orders. Awaiting your favors, we remain, yours truly,

The E. D. Clapp Mfg. Co.

Charles Buck, Millbury, Mass., has appointed Tennis & Wilson, Nos. 80 and 82 Reade street, sole agents in New York for Chisels, Gouges, Plane Irons, &c., manufactured by him. They will keep in stock a full line of his goods.

Graham & Haines, No. 113 Chambers street, have been appointed sole selling agents for Clough's Patent Wire Corkscrews. They have issued a revised price list of these goods, which we print below and which is subject to discount 25 per cent.

CLOUGH'S WIRE CORK SCREWS.

(The half numbers denote "Nickel" goods, otherwise like those bearing the whole number from which the fraction proceeds.)

No.	Per doz.	No.	Per doz.
6	$0.75	15	$0.75
6½	1.00	15½	1.00
7	0.85	16	1.00
7½	1.15	16½	1.25
8	1.00	17	2.00
8½	1.30	17½	3.00
9	1.00	18	3.00
9½	1.50	18½	5.00
10	1.20	19	1.50
10½	1.75	19½	1.85
11	1.50	20	2.50
11½	2.00	20½	3.50
12½	1.50	21	3.50
13½	2.00	21½	5.50
14½	2.00	22½	9.00

United States Patent, February 1, 1876. Patented also in Europe.

BRITISH IRON MARKET.

[*Special Report by Cable to The Iron Age.*]

London, June 2, 1880.

Scotch Pig.—There is but little business doing, and quotations are nominal. We quote makers' prices as follows:

Gartsherrie	51/
Coltness	56/
Glengarnock	50/6
Eglinton	47/

These prices show a falling off of 6d. in Glengarnock and 1/ in Coltness. In Eglinton there is a reduction of 2/ since the 19th ult.

Manufactured Iron.—The market continues dull, with very little demand. We quote Best Staffordshire Bars, nominally, £8.

Steel Rails—Are in small demand and prices are weak. Transactions are light. We quote, for ordinary sections, £6. 15/ @ £7.

Iron Rails—Continue to decline in value under the light demand, and prices are weak. We quote Welsh, £5. 5/ @ £5. 15/, a reduction of 10/.

Old Rails.—The offerings continue moderate and sales small. Prices remain weak and unchanged, viz., £4 for Old Ts.

Scrap.—There is nothing doing in Scrap, and quotations are nominal. We quote Wrought, £3. 15/.

IRON.

American Pig.—The market this week shows little animation, and some makers, in the unsettled condition of affairs, decline to name prices. Sales have been made since our last report of between 3000 and 4000 tons Lehigh Iron at $23 for No. 1 and $20 for No. 2; terms, prompt cash and delivery. We quote, nominally, Foundry No. 1, $23 @ $25; Foundry No. 2, $21 @ $23; and Gray Forge, $20 @ $21. We hear of some brands of Lehigh Iron being held for higher figures.

Scotch Pig.—The tone of the market this week is rather more depressed than at our last writing, and sales have been made at figures lower than importers are willing to quote to-day; thus we hear of sales of 500 tons Eglinton from store at $19, while holders ask $1 @ $2 more. Of other brands the aggregate sales for the week amount to about 2500 tons, 1000 of which was Glengarnock at $20.50. We quote Eglinton, $20 @ $21; Coltness, $23 @ $24; Glengarnock, $22.50, and Gartsherrie, $21.50.

Rails.—In the absence of business we quote, nominally, Steel, $58 @ $60 and Iron Rails, $48 @ $50.

Old Rails.—The demand has been light during the week, and sales in small lots are reported at lower figures than were current a week ago. A sale of a small lot of American Ts, said to be prime, is reported at $24.50. We quote $24.50 @ $26, but in the present condition of the market any quotation must be considered nominal.

Scrap.—The demand continues inactive, and stocks have been further increased by fresh arrivals during the week. We quote No. 1 Wrought from yard, $23 @ $25.

METALS.

Copper.—A somewhat improved feeling has been growing up during the week under review, 250,000 pounds Lake Superior changing hands at 18⅛¢ @ 18¼¢, the asking price at the close being 18½¢; it appears that the deliveries on contracts have now been made. We quote Baltimore nominally at the same figure as Lake Copper. There is also increased firmness at London. Chili Bars are quoted from there per cable £57, and Best Selected £62. 10/. Nothing of importance has occurred on the West Coast except the capture of Tacna by the Chileans, who were thence marching upon Arica. Although we have now the dull summer season before us on both sides of the Atlantic, it cannot be denied that the good crop prospects in Europe, if they are not marred by unfavorable weather previous to and during harvesting time, can hardly fail to exercise a powerful influence upon general business. With abundant grain crops and not unlikely very low corn prices, the consuming population of Europe will breathe freer, and its capacity of absorption will increase and extend to all sorts of goods, including metals. The revival, overdone by speculation, and subsequently killed by short crops and a very severe winter in Europe, may consequently be resumed in September or October on the other side, on a less extravagant scale, it is true, but with characteristics less evanescent. Speculation would, in such an event, also revive, not as wild probably as in the fall of 1879, but, aided by cheap money, it would, nevertheless, muster considerable forces, causing much of the recent precipitate fall in the value of Copper, Tin, Spelter, &c., to be recovered and perhaps maintained, unless production should prove altogether unmanageable. We merely mention this, as it strikes us that with cheap food, now in prospect in Europe, the very element will be created which, by its absence, stood in the way of a lasting revival there between September 1879 and March 1880; there may still be disappointments in this respect, we repeat, but expectations may, on the other hand, be more than fulfilled. The political horizon in Europe being without a single cloud, they may be on the eve of a solid, well-sustained material development there, of which the metals would soon feel the lasting benefit they stand so much in need of in the face of an exuberant production. We should never lose sight of the proverb that "daybreak is preceded by the darkest hour of night." Manufactures of Copper remain at the following rates: Braziers', 31¢ @ 37¢; Circles, 34¢ @ 37¢; Segment Sheets, 34¢; Locomotive Fire-box Sheets, 31¢; Sheathing Copper, 29¢; and Bolts, 31¢.

Tin.—Our market has ruled quiet since our last. Beside the jobbing demand, which is fair, about 100 tons Straits and about 50 tons Billiton have been sold at 15¾¢ @ 16¢, and 14¾¢ @ 15¢ respectively. Last Thursday 20,000 slabs Banca were sold at Amsterdam, bringing 43.37 guilders per 50 kilos., against the 51.25 of the March sale. Arrivals at New York for May foot up about 1300 tons, viz.: 700 Straits, 340 Australian and 260 Billiton. The shipments for the last half of May from the Straits to the United States have been, we are glad to say, confined to 50 tons. London cables £72 for Straits, and Singapore $22 per picul. By degrees the joint statistical position in England, Holland and the United States will begin to inspire confidence, and if then what we have indicated at some length under the head of Copper comes to the assistance of the general situation of trade and industry, a brightening aspect may set in and dispel the apprehensions which now exercise their depressing and paralyzing influence among us. We quote at the close, on a little firmer market and with less disposition to press sales: Straits, large lines, 16¢ @ 16¼¢; English Common, 16¢, and Billiton, 15¢ @ 15¼¢. *Tin Plates.*—Our market lacks activity. We quote large lots, ordinary brands, per box: Charcoal Bright, $6.75 @ $7.25; ditto Ternes, $6.12½ @ $6.37½; Coke Tins, $5 @ $5.25, and ditto Ternes, $5 @ $5.25.

Lead.—The outlook seems to be a little better. Stocks in the West are represented to be much reduced; they are certainly not large in first hands here, for they do not at present exceed 2000 tons. Small lots of Common Domestic have been changing hands, meanwhile, at 4½¢ @ 4¾¢, the latter being the price insisted upon toward the close. To import Lead from Europe now costs 5¼¢ @ 5½¢. Refined is nominally worth 5¢ @ 5¼¢. Manufacturers have, on June 1, fixed prices as follows: Sheet, 7½¢ per pound; Pipe, 7¢; Tin-lined Lead Pipe, 15¢, and Block Tin Pipe, 40¢.

Spelter and Zinc.—Great stagnation still prevails, and the dealings have been few. The asking price for Common Domestic Spelter is 5½¢ @ 5¾¢, and for Silesian, 5¾¢ @ 6¢. The Vieille Montagne Zinc Co., of Belgium, produced in 1879 65,839 tons of Spelter, against 73,955 tons in 1878. We quote Sheet Zinc, 7¼¢ @ 7½¢.

Nickel—Remains steady, with a moderate demand, at $1.50 per pound for prime American.

Antimony.—The market is quiet. We quote, at the close, Cookson, 19¢ @ 19½¢, and Hallett and Johnson, 17¢ @ 17½¢.

COAL.

Trade still remains very quiet, and the amount of Coal sold is quite insignificant. Some dealers report less activity than at any other time during the season. Country merchants and manufacturers are waiting to see whether there is going to be any break on account of the failure of the Philadelphia and Reading. Coal merchants and dealers have been and still are badly frightened. That there was a most promising opportunity for a bad break was only too plainly evident. They are not yet certain that the break will not take place, and hence, are uneasy. The tonnage coming forward is still large, considering that there is no market. Taken altogether, the situation is not a pleasant one. Except for the combination, there is no reason why Coal should not be at least one dollar per ton lower than at present. The Philadelphia and Reading road, in the hands of a receiver, may find that its interests are somewhat different from what they have been. This road has had to bear a much larger share of the restriction of output than any of the New York companies. It may be that the receiver will make an effort to recover its share. It appears certain that the prices are not high enough to entirely make up for the diminished quantity. What action will be taken in regard to the tonnage for June is not yet known. It is said by some that after the 15th there will be no restriction. In any event, we think there need be no fear of a short supply. If the half-time plan is continued until the middle of July, there will be, to judge the future by the past, an ample supply of Coal to meet all the wants of the country. There is often a great cry made that the roads cannot carry in half a year all the Coal that will be wanted. As we are now only 700,000 tons behind last year, which was a very exceptional one, we have no reason to fear a short supply, even though the half-time work continues for some weeks longer. The end of June will be watched with a great deal of anxiety by the dealers, as they think they can then decide the question of whether there will be a break.

Freights still continue low to the Eastern ice ports.

Prices are the same as last week with the same "commissions." Lehigh Lump and Broken, $5; Broken and Egg, $4.25; Stove and Chestnut, $4. Free burning coals are quoted at about $4 for all sizes except Stove, which is held at $4.25. Pittston at Newburgh is from 5 to 15 cents off. Lackawanna is quoted at $3.90 for lump.

EXPORTS

	Quan.	Val.
Dutch West Indies.		
Ptlm., gals.	2961	$321
Hdw., cs.	10	146
Tacks, cs.	1	35
Sew. ma., cs.	6	181
Amsterdam.		
Ptlm., gals.	170,367	12,775
Hamburg.		
Mach'y, cs.	55	6,382
Cutlery, cs.	5	456
Print. presses	12	485
Sew. ma., cs.	676	10,822
Ag. imp., pgs.	23	1,459
Hdw., pkgs.	180	2,984
Belting, cs.	4	927
Mf. iron, pkgs.	14	538
Iron ore, bags	128	3,500
Pipe, pcs.	749	5,500
Wringers, cs.	6	100
Pumps, pkge.	6	505
S. rollers, cs.	4	160
Bremen.		
Ptlm., gals.	440,358	35,300
Ag. imp., pkgs	249	3,500
Hdw., cs.	12	497
Mf. iron, pkgs.	12	725
Sandpaper, cs	2	167
Mach'y, cs.	1	150
Rotterdam.		
Wringers, cs.	28	1,200
Pumps, pkge.	1	100
Lub. oil, gals.	1000	363
Hdw., cs.	5	49
Glassw'e, cs.	2	16
Ag. imp., pkgs	13	940
Platdware, cs.	1	120
Antwerp.		
Hdw., cs.	25	659
Belting, bales.	4	1,037
I. rolls, cs.	5	1,400
Lub. oil, bbls.	65	1,000
Machinery, cs.	1	108
Ag. imp., pgs.	3	181
British East Indies.		
Ptlm., gals.	196,000	23,520
Havre.		
Ag. imp., pgs.	17	1,230
Lub. oil, gals.	7715	1,918
Machy., cs.	1	500
Silverware, cs	1	1,500
Port Mahon.		
Ptlm., gals.	30,000	1,850
Vigo.		
Ptlm., gals.	60,000	6,600
Scale	1	60
Cadiz.		
Ptlm., gals.	10,000	1,100
Pumps, pkgs.	6	227
Hdw., cs.	5	90
Porto Rico.		
Grindstones	100	76
Glassw'e, pgs.	97	359
Hdw., pkgs.	37	459
Nails, kegs.	54	208
Pumps, pkgs.	2	59
Pltdware, cs.	1	50
Sew. ma., cs.	20	393
Ag. imp., pkgs	24	293
Ptlm., gals.	1880	355
Steel, pkgs.	5	37
Mf. iron, pkgs.	25	261
Iron safe	1	210
British North American Colonies.		
Coal, tons	133	650
Ptlm., gals.	1100	99
Pig iron, tons.	5	200
Mf. iron, pkgs	9	54
Iron ore, tons.	128	765
British West Indies.		
Iron, pkgs.	7	88
Sew. ma., cs.	7	112
Tinware, cs.	3	52
Nails, kegs.	33	113
Ptlm., gals.	37,196	4,309
Machy., cs.	42	2,423
Glassw'e, pgs.	97	801
Mf. iron, pkgs.	98	1,177
Hdw., cs.	79	1,586
Pltdware, cs.	3	150
British Guiana.		
Hdw., cs.	7	158
Cartridges, cs	2	320
Ptlm., gals.	3000	338
Nails, kegs.	85	398
Cuba.		
Glassware, cs	23	448
Tinfoil, cs.	5	100
Hdw., cs.	105	1,409
Machy., pkgs.	16	198
Wire, pkge.	1	170
Hoops	30,000	950
Mach. oil, cs.	13	90
Sew. ma., cs.	241	2,718
Nails, kegs.	101	490
Windmill	1	45
Mf. iron, pgs.	57	576
Ptlm., gals.	180,000	17,100
French West Indies.		
Glasswre, cs.	26	413
Ptlm., gals.	5080	585
Pumps, pkge.	1	50
Hdw., cs.	18	313
Mf. iron, pkgs	8	95
Ag. imp., pkgs	5	82
United States of Colombia.		
Powder, lbs.	125	25
Iron, pkgs.	99	1,326
Pumps, pkgs.	4	173
Sew. ma., cs.	73	1,535
Hdw., pkgs.	83	1,457
Plbs. mtls., pgs	4	105
Mach. oil, gals	122	86
Boiler	1	2,520
Belting, cs.	2	99
Carbines, cs.	2	103
Nails, kegs.	19	78
Muskets, cs.	2	84
Revolvers, cs.	5	457
Mf. iron, pkgs	154	2,265
Machy., pkgs.	654	18,164
Cutlery, cs.	17	479
Glassware, cs.	61	830
Brass, case	1	48
Ptlm., gals.	5500	976
Tinware, cs.	2	94
Cartridges, cs.	6	104
Zinc, pkgs.	4	127
Brazil.		
I. tank	1	$190
Cartridges, cs	2	36
Cutlery, cs.	220	4,960
Shoe nails, bxs	15	115
Belting, bale.	1	285
Sandpaper, cs.	1	46
Copygraphs, cs	1	53
Trucks	6	33
Irons, cs.	10	60
Tinware, cs.	7	350
Mf. iron, pkgs	57	657
Revolvers, cs.	1	110
Rifles, cs.	9	657
Ptlm., gals.	85,902	10,064
Hdw., pkgs.	395	6,607
Iron safes	3	399
Glassware, cs.	24	263
Nails, kegs.	160	633
Sew. ma., cs.	35	617
Ag. imp., pkgs	8	21
Africa.		
Ptlm., gals.	2050	2
Cartridges, cs	6	1
Notions, cs.	1	
Nails, kegs.	83	31
Rifles, cs.	1	227
Br. ket., casks	18	2,560
Mf. iron, pkgs.	54	195
Hdw., cs.	21	519
Sew. ma., cs.	9	241
Machy., pkgs.	3	224
London.		
Met. goods, cs.	16	260
Cars	4	4,800
Machy., cs.	48	8,156
Ag. imp., pkgs	15	920
Lub. oil, bbls.	300	2,500
Glassw'e, cs.	1	3
Pumps, pkge.	1	10
Mf. iron, pkgs	69	1,547
Hdw., pkgs.	332	5,993
Nails, kegs.	2	10
Coal, casks	6	30
Brass gds., cs.	31	1,830
Sew. ma., cs.	126	1,553
Hull.		
Ag. imp., pkgs	62	3,331
Hdw., cs.	106	2,988
Mf. iron, pkgs	31	565
Pumps, pkgs.	7	112
Glassware, cs.	1	150
Nails, kegs.	5	24
Rifles, cs.	150	25,500
Bir. com., bbls	7	213
Liverpool.		
Hoops, bdls.	39	117
Ag. imp., pgs.	167	5,930
Mf. iron, pkge	1	50
Pumps, pkge.	1	30
Metal, cs.	3	245
Hdw., cs.	14	835
Machy., cs.	213	7,998
Pltd. ware, cs	5	500
Lub. oil, bbls.	130	1,472
Belting, cs.	1	850
Bristol.		
Hdw., cs.	8	400
Cardiff.		
Hdw., cs.	2	37
Ag. imp., pkgs	27	2,560
Newcastle.		
Lub. oil, bbls.	66	863
Glasgow.		
Slates, cs.	22	88
Gibraltar.		
Ptlm., gals.	43,500	4,685
Pumps, pkge.	1	50
Central America.		
Hdw., cs.	13	513
Zinc, casks	10	500
Ptlm., gals.	1000	123
Bridges	30	10,154
Iron, bdls.	20	304
Locomotive	1	9,000
Madagascar.		
Ptlm., gals.	70,000	8,400
Zinc, casks	3	140
Nails, kegs.	32	124
Mf. iron, pkgs	4	114
Hayti.		
Ptlm., gals.	4131	480
Hdw., cs.	23	243
Machy., cs.	10	300
Glassw'e, pgs.	35	216
Nails, kegs.	34	115
Mexico.		
Nails, kegs.	361	1,222
Sew. ma., cs.	119	2,671
Glassware, cs.	93	979
Mf. iron, pkgs	26	441
Packing, bale.	1	300
Tel. mtl., pgs.	10	607
Pumps, pkgs.	2	65
Cutlery, cs.	32	1,009
Cartridges, cs	9	244
Zinc, casks	6	384
Wire cloth, bx	1	56
Pistols, cs.	1	467
Locomotive	1	8,250
R R matl., pgs	308	2,983
Hdw., pkgs.	258	4,903
Nails, cs.	21	232
Mach'y, pkgs.	151	14,887
Gas fixtrs, cs.	3	125
Mach. oil, cs.	21	80
Tinware, cs.	14	385
Fire-arms, cs.	7	2,490
Can. fixts., cs.	4	1,500
Ptlm., gals.	25,000	3,098
Ag. imp., pkgs	63	1,191
Wire, spools	141	1,527
Chains, pkgs.	5	137
I. tubes, bdls.	27	130
Br. cups, csks	57	7,200
Tacks, cs.	7	100
Lub. oil, bbls.	2	55
Revolvers, cs.	1	196
Iron, bars	3	42
Steel rails, pgs	411	4,284
Venezuela.		
Mf. iron, pgs.	47	411
Ptlm., gals.	14,694	1,719
Shot, kegs	30	219
Shot, sacks	75	398
S. lead, rolls	4	210
Ag. imp., pgs.	19	141
Tinware, cs.	3	34
Mach'y, cs.	54	1,058
Glassware, cs	45	310
Sew. ma., cs.	103	2,001
Hdw., cs	150	2,086
Ld. pipe, pgs.	22	360
Pltdw'e, cs.	1	130
Nails, kegs.	68	340
Tacks, cs.	28	
Cutlery, cs.	11	

IMPORTS

Of Hardware, Iron, Steel and Metals into the Port of New York, for the Week ending June 2, 1880:

Hardware.

Bartram Bros.
Machinery, cs., 2
Bloomfield, J. C.
Cop'd wire, csks., 1
Boker Hermann & Co.
Hdw., cs., 20
Hdw., csks., 301
Canada, For,
Bolts and nuts, cs., 13
Creeby, J. & Co.
Cutlery, cs., 5
Curley, J. & Bro.
Cutlery, csk., 1
DeWitt Wire Cloth Co.
Brass wire, cs., 17
Field, Alfred & Co.
Anvils, 223
Nails, csk., 1
Wire, csks., 2
Hdw., cs., 15
Fo'som, H. & D.
Arms, cs., 3
Guns, cs., 11
Friedmann & Lauterjung,
Mdse., pkgs., 4
Goetz, Solomon & Co.
Hdw., bbl., 1
Graef Cutlery Co.
Mdse., pkgs., 6
Kausche & Downing,
Wire, csks., 2
Cutlery, cs., 5
Lent & Bramdu,
Cutlery, csk., 1
McCoy & Sanders,
Hdw., case, 1
Hdw., csks., 2
Meriden Britannia Co.,
Mdse., pkgs., 2
Morris, L. W.
Arms, cs., 7
Moss, F. W.
Files, csks., 3
Rogers, H.
Mdse., pkg., 1
Rice, Lewis & Son,
Wire rope, reels, 3
Schoverling, Daly & Gales,
Arms, cs., 5
Schuyler & Duane,
Arms, cs., 6
Hartley & Graham,
Arms, cs., 4
Seligman, J. & W. & Co.
Galv'zed wire, rings, 215
Sellers, W. P.
Cutlery, cs., 3
Thornton, John & Co.
Tinware, cs., 2
Tillotson, L. G. & Co.
Wire, lots., 327
Wetzlar, M.
Mdse., pkg., 1
Whelan, Wm.
Machinery, pkge., 1
Wiebusch & Hilger
Hdw. Co.
Mdse., pkgs., 21
Witte, John G. & Bro.
Iron chains, bbls., 12
Guns, cs., 4
Needles, cs., 2
Order,
Grindstones, 25
Hdw., cs., 4
Wire, pkgs., 1998

Iron.

Bank of New York National Banking Association,
Hoop iron, bdls., 3994
Baring Bros. & Co.
Wire rods, pkgs., 665
Pig, tons, 850
Coddington, T. B. & Co.
Sheet iron, pkgs., 80
Drexel, Morgan & Co.
New Rails, 1397
Old rails, pcs., 2138
Johnson, J. S.
Old iron, tons, 2½
Rice, Lewis & Son,
Sheet iron, bdls., 315
Spring, A. & S. E.
Old rails, tons, 50
Stroud, W. L.
Hoops, bdls., 2130
Swift, H. H. & Co.
Old iron, kilos., 200,000
Vatable, H. A. & Son,
Old iron, tons, 2
Wright, Peter & Son,
Ore, tons, 400
Order,
Bars, 323
Bundles, 479
Fish plates, bdls., 2559
New railway iron, tons, 2000
Old heavy wrought scrap, lbs., 558,892
Old iron, a lot
Old rails, 6960
Old rails, pcs., 13,879
Ore, tons, 300
Pig, kilos., 50,900
Pig, tons, 1139
Railroad iron, bars, 18,947
Railroad iron, tons, 1500
Rails, 3000
Rails, tons, 585
Rods, lots, 304
Scrap, tons, 2674¼
Spiegel iron, kilos., 50,830
Wire rods, bdls., 212
Wire rods, pkgs., 12,142

Metals.

Baring Bros. & Co.
Tin plates, bxs., 105
Taggers, bxs., 20
Galvanized tinned sheets, bxs., 3
Coddington, T. B. & Co.
Tin plates, bxs., 359
Condit, Hansen & Van Winkle,
Nickel, cs., 6
Davidson, J. A.
Nickel, pkgs., 13
Field, Alfred & Co.
Cobalt, case, 1
Johnson, J. S.
Old brass, box, 1
Kinney & Lea,
Old brass, csks., 2
Moors, J. B. & Co.
Tin, slabs, 1500
Phelps, Dodge & Co.
Tin plates, bxs., 2740
Pratt, Chas. & Co.
Tin plates, bxs., 877
Semon, Bache & Co.
Tin plates, cs., 5
United States Stamping Co.
Tin plates, bxs., 111
Windmuller, L. & Rolker,
Sheet zinc, csks., 25
Order,
Old brass, lbs., 1800
Old copper, cs., 5
Tin plates, bxs., 252
Tin, slabs, 1913

Steel.

Baring Bros. & Co.
Bundles, 437
Bingham, W. & Co.
Bundles, 138
Bars, 24
Brown, W.
Bars, 22
Case, 1
Bundles, 438
Moss F. W.
Bars, 2
Bundles, 104
Naylor & Co.
Steel tires, 76
Order,
Bundles, 194
Cases, 13
Casks, 7
Coiled steel, bdls., 2357
New rails, 1073
Old rails, tons, 18
Old railway leaf spring steel, tns, 9
Raw steel, kilos., 638,131
Rods, bdls., 181
Scrap, tons, 400
Spring steel, tons, 105
Steel and iron, csks., 35
Steelware, cs., 8
Wire, rolls, 1581

OLD METALS, PAPER STOCK, &c.

The Old Metal market continues dull, and our quotations show a further decline. In the Rag and Paper Stock market there are but few changes to note since our last report, what few sales there are being forced.

The purchasing prices offered by dealers for Old Metals are as follows:

Copper, heavy	₩ lb.	$0.15	@ $0.16
Copper Bottoms	"	.13	@ .14
Yellow Metal	"	.09	@ ....
Brass, heavy	"	.11	@ .12
Brass, light	"	.08	@ .09
Composition, heavy	"	.13	@ .14
Lead, heavy	"	.04	@ .04¼
Tea Lead	"	.03¾	@ .04
Zinc	"	.04½	@ .04¾
Pewter, No. 1	"	.11	@ .12
Pewter, No. 2	"	.07	@ .....
Wrought Iron	₩ ton	17.50	@ 20.00
Light do	"	10.00	@ 12.50
Stove Plate	"	10.00	@ 12.50
Machinery do	"	15.00	@ .....
Grate Bars	"	7.50	@ .....

The prices current for Rags, &c., are as follows

Canvas, Linen	₩ lb.	3½c. @ .....
White Cotton, New	"	3½c. @ .....
" No. 2	"	2½c. @ .....
White, No. 1	"	3¼c. @ 3¾c.
" No. 2	"	2½c. @ .....
Seconds	"	1½c. @ 1¾c.
Soft Woolens	"	9 c. @ .....
Mixed Rags	"	2 c. @ 3 c.
Gunny Bagging	"	1¾c. @ .....
Jute Butts	"	2¾c. @ .....
Kentucky Bagging	"	4 c. @ .....
Book Stock	"	2½c. @ .....
Newspapers	"	1½c. @ 2 c.
Waste Paper and Scraps	"	½c. @ ¾c.
Kentucky Bale Rope	"	4 c. @ .....

PHILADELPHIA.

(By Telegraph.)

PHILADELPHIA, June 2, 1880.

The labor question is attracting a good deal of attention just now; the men demand a sliding scale commencing at $4.50 per ton, on the base of 2.5¢ for Bars. There is no provision for anything below 2.5¢, so that the ironmasters would now have to base wages at figures which they cannot obtain for Iron. There is a determination to resist the demand, and it is almost certain that the employers will be successful, as business is exceedingly dull, and it is almost impossible to sell Bars in quantity even at 2.25¢. The mills have been closed nearly two weeks, and the prospects of starting up again at an early date is not encouraging. Stocks are large enough to prevent anything like embarrassment to consumers, and a lockout at this time would doubtless be worse for the men than it would for the masters.

The Reading Coal and Iron Company's affairs seem to be running smoothly, and, as we understand the matter, there is nothing to cause uneasiness to its creditors. A few days ago the receivers notified parties with whom the company had contracts running that, in consequence of the suspension, all contracts were cancelled. Replies were sent back to the effect that the company would be held responsible for any losses which might accrue from non-fulfillment of their engagements, since which the receivers have notified parties that they will accept deliveries, &c., as before, so that, practically, those who bought or sold from the company are in all respects in the same position as before the suspension.

A meeting of the creditors of the Reading Iron Works was held yesterday, at which a committee was appointed to make further investigation into its affairs, and report at another meeting. The impression seems to be that with an extension of time all liabilities will be paid in full. They paid $75,000 for last month's wages, and have plenty of orders on hand at good prices. The feeling seems to be in favor of keeping the works in active operation, and it is not likely there will be any suspension. They are employing 2000 men at present, and are running full in all departments.

We have been called upon by Messrs. Cabeen & Co., agents for the Glendon Iron Co., in regard to a statement which has appeared in several papers to the effect that the company have 50,000 tons of pig iron on furnace banks, waiting shipment. They authorize us to state that the quantity is not over 4500 tons, which is not more than the amount they have entered for June delivery. The price fixed for the current month is $22 at furnace for Gray Forge.

Office of *The Iron Age*, 220 South Fourth St., PHILADELPHIA, June 1, 1880.

Pig Iron.—There is but little change to note in the general condition of the market, although the feeling is better, and indications of activity are increasing. Prices are more uniform than they were a week ago, and the business done would probably show a better average of prices than during the two preceding weeks. We still hear of lots offered at very low prices, and it is quite likely that parcels can be picked up at lower figures than are currently quoted; but there is a healthier tone to the market, and the feeling is gaining ground that present prices are on a safe foundation. The large amount of iron on the market prevents anything like buoyancy, and it is not easy for parties, at short notice, to make sales in quantity, unless by liberal concessions in price. Those who have a regularly established trade, however, find no difficulty in placing considerable quantities at current rates, and the disposition (or necessity) to buy more largely appears to be increasing. The shutting down of the mills here and in other sections of the country, as well as the near approach of midsummer, will probably tend to lessen the demand for a while, and any decided improvement ought not, therefore, be looked for in the immediate future. The fall trade, however, is looked forward to with the greatest confidence, and although prices may not advance a great deal, a large and satisfactory business seems assured. Consumption shows no diminution whatever; the manufacturing interests are all in good condition, plenty of orders on hand and prospects which indicate permanency in the demand. There is not the same eagerness to place orders as was noticeable during "the boom," but there is a steady legitimate demand, sufficient to keep the shops full of work for months to come. This assertion is based upon extended inquiry and observation, and there is little doubt that business is on as secure a foundation to-day as at any time during the past 12 months. The large quantity of foreign Iron imported is a misfortune, but probably not sufficient to depress trade for any serious length of time, and it may not be many months before its effect will be entirely lost. It should teach the lesson, however, that prices on this side of the Atlantic cannot be advanced beyond present figures without leading to keen competition with foreign Iron. Scotch Iron seems a trifle steadier, although it would be difficult to effect sales in quantity without cutting prices. The extreme quotations may be regarded as $20.50 @ $23.50, according to brand. Middlesboro Iron is offered at $19 @ $20, but there is no disposition to buy except in a very small way. Bessemer is steady at $23 @ $25, with a better demand than for some time past. American is irregular in price and difficult to quote. The best brands of Foundry Irons are held with considerable firmness, and sales are reported at $25 up to $26. There is a general disposition to hold firmly at $25, but outside lots can be had at less money, the extreme range being as follows: No. 1 Foundry, $24 @ $26; No. 2 Foundry, $22.50 @ $24; Gray Forge, $20 @ $23; Charcoal Iron, $40 @ $45, according to quality.

Blooms.—The market continues dull, and it is impossible to effect sales in quantity at quoted rates. A few small lots have changed hands at about the following rates, viz.: Charcoal Blooms, $80 per ton of 2464 lbs.; Run out Anthracite, $65; Sunken Scrap Blooms, $55 per ton of 2240 lbs.; and Northern Ore Blooms, $50.

Muck Bars.—The market shows no improvement, and no sales have been made, so far as we can learn. Holders ask $43 @ $45, without obtaining any offers from buyers.

Structural Iron.—There is more inquiry and some fair-sized orders have been taken, with a considerable inquiry from other sources. Prospects are improving, and there is little doubt the mills will have all the business they can attend to. A considerable amount of bridge work is being given out, and the Pennsylvania Railway Company are also likely to be in the market shortly for material for their extension in Philadelphia. Prices are somewhat unsettled, but 2.8¢ @ 3¢ for Angles, and 3.3¢ @ 3.5¢ for Beams, Channels and Tees seems to be average quotations.

Plate and Tank Iron.—The market is dull, and with the exception of a few small orders, very little business has been done during the past week. Manufacturers are anxious for business, as they are all pretty well through with their orders, and prospects are not encouraging, so far as regards the immediate future. Under these circumstances prices are difficult to quote, but the following are the usual asking rates, viz.: Tank Iron, 2.6¢; C. No. 1, 2¾¢; C. H. No. 1, 2.9¢; Flange, 3.2¢; Best Flange, 4¢; Fire-Box, 4.5¢ @ 4¾¢; Solid Bloom, 4¾¢ @ 6¢.

Sheet Iron.—There is no improvement to notice in this department; business continues dull, and prices weak and drooping. There has been more inquiry during the week, and it is probable that some orders have been placed, but it is believed at prices lower than are generally quoted. Manufacturers are carrying a good deal of finished Iron, but the stove trade and other large buyers have not begun to place their orders yet, so that when the demand does set in it is likely to be very large. Dealers and consumers are reducing stocks to the lowest point possible, but consumption is large and the present inactivity cannot therefore continue much longer. For small lots we quote as follows:

Common Sheet, No. 25 to 28	5 ¢
Common Sheet, No. 22 to 25	4¾¢
Common Sheet, No. 16 to 21	4½¢
Best Refined ¼¢ @ ½¢ advance on the above.	
Best Bloom Sheets, No. 26 to 28	7½¢
Best Bloom Sheets, No. 22 to 25	7¼¢
Best Bloom Sheets, No. 16 to 21	7 ¢
Common Red Plates, 3-16 to 16	3.4¢
Blue Annealed, 3-16 to 16	3.5¢
Best Bloom Galvanized, discount	25 %
Second quality, discount	35 %

Bar Iron.—The mills in Philadelphia have not been in operation during the past week, and business has therefore been almost of a holiday character. Some parties have been pressing sales at extremely low figures, but there is no disposition to buy unless stock is actually required. A fairly active business has been done at the stores, and stocks are a good deal broken up, so that the mills will have to be called upon to supply the deficiency before long. Business is unsettled, however, and as a rule the feeling is one of uncertainty in regard to the future. The fact of heavy consumption seems to be thoroughly well established, and it is therefore hoped that the present depression will soon pass away. In the meantime 2.4¢ @ 2.5¢ is the nominal rates, but we hear lower figures quoted for large lots.

Coke.—The price has been reduced to $1.50 on cars at ovens, at which figure sales are now being made. It is not thought likely that there will be any further reduction in prices.

Steel Rails.—The feeling seems to be stronger, and buyers are in the market for large lots. Sellers have no difficulty in finding a market at about current rates, and a fair amount of business has been entered during the past week. Sales of English Rails are reported at something over $60 at tide, also rails from foreign Blooms at $63, and light sections at $65. It is possible that orders would be taken at $60 for late deliveries, but for summer and fall, manufacturers appear to be firm at $62.50 @ $65. The tone of the market is healthy, and $60 to $65, according to location of mill and time of delivery, may be regarded as fair quotations.

Iron Rails.—Business still continues in a dull and lifeless condition, and buyers appear to postpone their orders to the latest moment possible. Sellers are firm at $48 @ $50, and with the advance in Old Rails, and the certainty of a good demand, there is not much disposition to shade prices. We have not heard of any important transactions during the week, but business is near at hand, and the present inactivity cannot be long continued. It is estimated that orders for several thousand tons will be given out in the course of the present month, and present quotations are likely to be maintained.

Old Rails.—The firmness noted last week has become more confirmed, and lots to arrive are held with considerably more firmness. Spot lots are offered at $26, but, as they are not specially wanted, buyers are unwilling to pay more than $25. There is evidently more confidence in values, as bids of $25.50 @ $27 are freely made for deliveries during August and later, but holders have advanced their figures, and are not anxious to anticipate the market. We have not heard of any actual transactions except small lots, spot delivery, at about $25 @ $26.

Scrap Iron—Shows no improvement, and it is difficult to find buyers for the large quantities arriving. Wrought is offered at $23 @ $24; Cast, $18 @ $20.

Nails.—The market is very dull, and, although $3 is the nominal quotation, buyers claim to do considerably better on fair sized lots.

PITTSBURGH.

Office of *The Iron Age*, 77 Fourth Avenue, PITTSBURGH, PA., June 1, 1880.

The scale of prices between the ironmasters, puddlers and rollers expires to-day, and as the latter demand a higher scale, to which the former refuse to accede, a lockout is threatened. The ironmasters are willing to continue the old scale, which is certainly all that can reasonably be expected in the present depressed, unsettled and unsatisfactory condition of the Iron business, and it strikes the disinterested observer that the workmen are unreasonable in demanding an advance in the present condition of affairs; and it is very evident, that in the event of a lock-out, they will suffer more than the mill owners, although the entire community would be greatly damaged directly as well as indirectly. There are other important interests dependent upon the Iron business. Among others, Coal, Coke, Ore, &c., and in the event of a lockout, thousands of men would be thrown out of employment and thereby deprived of the means of making a livelihood. A meeting of the ironmasters took place on Saturday, at which the proposition of the Amalgamated Iron Association was considered, and, after being fully discussed, it was rejected. Several conferences have been held within the past week, but nothing definite arrived at, and unless the workmen conclude to reaffirm the old scale, a lockout appears inevitable, as the ironmasters appear determined not to accede to the demands by the Amalgamated Iron Association. There is good reason to believe that the majority of those connected with the Amalgamated Iron Association would prefer reaffirming the old scale to a lockout; but, for fear of being spotted as black sheep, they are obliged to abide by the decrees of the association. No city in the country suffers more from an Iron lockout than Pittsburgh, as Iron is her chief interest; it is computed that it would leave 50,000 men out of employment; hence our entire community are deeply interested in the matter.

Pig Iron.—There has been no perceptible change in the situation during the past week. Furnacemen, as might be expected, feel very much discouraged; with foreign Iron on the one hand and a lock-out threatened on the other, the outlook is anything but promising, and many of them have concluded that the best thing to be done under the circumstances is to blow out and curtail production and thereby prevent a further accumulation of stock. While it is true that the cost of production has been materially reduced, it is still too high as compared with what some buyers of Pig Iron expect to be able to buy at when business opens up, and it does seem that a general suspension for a time would be the best thing that could happen the furnacemen; indeed, the only encouraging feature to note in connection with the business at the present time, is the fact that so many furnaces have already blown out, and others still in blast will, no doubt, do likewise before long, unless there is a change for the better in the meantime. In regard to prices, it is simply impossible to quote with any degree of accuracy. While there was a small sale (50 tons) of mill iron reported at $20, cash, standard brands of native iron are generally held from $3 to $5 per ton, higher than the price quoted. Cold-Blast Charcoal, in consequence of a light supply, appears to be holding its own better than any other kind, being quoted at $50 @ $53, with a small sale reported at $50, 4 months.

Ore.—There is nothing new to report; the situation remains substantially the same as noted in last report. It is generally believed that the Lake Superior companies will follow in the wake of the Republic and Cleveland Iron Mining, and make a corresponding reduction to those of the furnacemen who bought during the "boom."

Manufactured Iron.—The action of the Amalgamated Iron Association in demanding an advance for puddling, rolling, etc., has placed the market for finished Iron in a most unsatisfactory and unsettled condition, and it looks at the present writing as if a "lockout" was likely to be inaugurated.

Nails.—The market continues dull, as it usually is at this particular time. The dull season is upon us, and no one expects much, if any, improvement in the demand until the fall trade opens up, which is looked for about the middle of July. Very few, if any, of the factories, either here or at Wheeling, are running to their full capacity; some of them are stopped altogether. Manufacturers generally are averse to "piling up." No change in the card; $3.25, 60 days, 2 per cent. off for cash, and the usual abatement of 10 cents per keg on lots of 250 kegs and upward.

Railway Supplies.—There appears to be an increasing inquiry for goods of this kind, which is not unexpected in view of the fact that a good many new railroads are under way, and thus the old roads are obliged to replenish their depleted stocks. Spikes are still quoted at 3¢, 30 days; Track Bolts, 4½¢; Splice Bars, 2½c.

Wrought Iron Pipe.—The movement continues backward for the season, caused by the steady decline in prices; once the market becomes settled, and there is a prospect of an advance, a largely increased business may be looked for. It is thought that prices are now down to the lowest notch, and that the next change will be upward. Discount on Gas and Steam Pipe, 65 @ 70 per cent.; on Boiler Tubes, 47½ @ 50; Oil Well Casing and Tubing, 20 off.

Scrap.—The movement in all kinds of Scrap continues very meager; there is so very little doing that dealers decline to give quotations. No. 1 Wrought may be quoted at $24 @ $25 per net ton. There is scarcely any demand for Scrap Iron of any description.

Coke.—The market is less active and weaker in tone, which may be attributed largely to the very unsatisfactory condition of the Pig Iron interest and the blowing out of so many furnaces, by reason of which the demand for Coke has been curtailed. Prices are weaker, and we now quote Connellsville at $2 to $2.50 per ton, delivered free on cars at ovens.

Window Glass.—The situation has not varied materially since the date of our last report, with the exception that orders continue to fall off, as is usually the case at this season. The past year has been the most satisfactory one the Window Glass manufacturers have had for a long time, as, in addition to having all they could do, they were enabled to obtain remunerative prices. Discounts remain unchanged.

Petroleum.—The market for Crude Petroleum has stiffened up very materially within the past few days, a sharp advance having been established, and notwithstanding there appears to be no substantial reason therefor, the tendency is still upward. There is no falling off in the production. The visible supply is very large and increasing, while the consumption continues insignificant, very few of the refineries, either here or elsewhere, being in operation. It is expected the export demand for Refined will open up soon, and this, in connection with a great deal of idle money, has tended to bring about the advance to which reference has been made.

CHATTANOOGA.

Office of *The Iron Age*, Market and 8th Sts., CHATTANOOGA, May 31, 1880.

ade generally has been fair during the week, and everything but Iron products showed a fairly steady and satisfactory market. In the latter the confusion of the previous week has continued. Quotations are still impracticable. Those desiring to buy in this market would only be misled by any figures we could report. There is general feeling that prices will no go lowe than the average of sales at this time, and that there will be an advance soon. Several railroads have ordered supplies pretty liberally during the week. Inquiries for Bar have been larger than during the previous week. But, in the present state of the market, buyers are apt to "feel" every maker and dealer who has the goods he is in quest of before buying. One inquiry for Bar was for 600 tons.

Southern founders are ordering Pig pretty liberally, especially within the last days of the week. There are no transactions worth note in Gray Forge, but appearances favor the theory that it is a question of time when a large movement of this grade must commence. Consumers are pressing for lower figures. Producers are pretty generally determined to make no further concessions. When one or the other gives in business will show more life, and prices become steadier.

The Vulcan Iron and Nail Works suspended operations on Thursday. Mr. James C. Warner has been appointed receiver, and will reopen the works within a few days. These mills manufactured Nails, 20 net tons per day—400 kegs; Bar, Bolts, Spikes, &c.—20 net tons. They have been operated up to nearly their full capacity from December, 1879 to April 1, 1880. The liabilities are about $376,000, assets about $200,000. The failure has had a tendency to stiffen the market for Bar Iron; but if the intention to start up and run again is presently put into execution the supply will be about as before.

BOSTON.

MAY 29.—The steadier feeling noted in our last still continues. As the market becomes more settled, the nominal prices at which many lots have been held during the past few weeks are reduced, and we shade our quotations $1 @ $2 ₩ ton all round. For *American Pig Iron* we quote a range of $24 @ $28 for No. 1 X, $23 @ $26 for No. 2 X, and $22 @ $23 for Gray Forge. These prices are f. o. b. at the shipping port. *Foreign Iron.*—The receipts of foreign Iron at this port the past week have been unimportant. In this market Eglinton sells at $22; Glengarnock and Gartsherrie at $23; Langloan and Coltness at $25; English Pig (Middlesbrough) is offered here at $21. *Old Rails* have recovered somewhat from the late extreme depression, and there have been sales at $27, which is a fair quotation to-day, though some holders in this market refuse to sell under $30. *Manufactured Iron* continues dull and weak, and any pressure to sell results in low prices. The nominal price of Bar is 2½¢, and some of the mills are firm at that figure, but there is a good deal of cutting, and sales are made as low as 2¢. The same is true of Plate Iron and Boiler Tubes. The nominal price of Common Tank Iron is 3¼¢, but there are sellers who are glad to take orders at 3¢ and under. For C. No. 1, 3⅜¢ is the outside figure; for C. H. No. 1 Shell, 3¾¢; and for Flange, 4¾¢. The nominal price of Boiler Tubes is at 55 % discount, but sales are made as low as 57, 58 and 60. Nails are quiet on a basis of $3 ₩ keg for 10d. to 60., and Norway Iron at $95 ₩ ton for Bars and $115 for shapes. *Other Metals.*—Tin has been the most demoralized of metals of late, and 1-ton lots of Straits could have been bought the past week at 16¢. There has been one sale of a large lot at 15½¢, but it is doubtful if further purchases could be made at that figure. We quote 16¢ as the nominal price of Straits Tin in good-sized lots to-day. This metal sold at 24½¢ in January, 1880, against 15½¢ @ 16¢ 12 months previously. Copper has been slow of sale, but two large Massachusetts consumers have taken 50,000 lb apiece this week at 18¢, and there have also been some smaller sales. The asking price for large parcels is 18½¢ at the close, but purchases could probably be made at 18¢. Lead is dull and weak at 4½¢ @ 4¾¢, and there have been sales of distressed lots in this market at lower figures. Spelter is wholly nominal at 5¾¢ @ 6¢.—*Commercial Bulletin.*

LOUISVILLE.

Messrs. GEO. H. HULL & Co., under date of May 28, write us as follows: The market continues with few sellers and no buyers, except at very low figures. Some few lots have changed hands at prices considerably lower than what furnaces generally are willing to accept, and what is estimated to be considerably below the present price of production. We change our quotations to represent these forced sales:

FOUNDRY IRONS.

No. 1 Hanging Rock, Charcoal	$27.00 @ 28.00
No. 2 " "	26.00 @ 27.00
No. 1 Southern, Charcoal	26.00 @ 27.00
No. 2 " "	25.00 @ 26.00
No. 1 Hanging Rock, Stonecoal and Coke	26.00 @ 27.00
No. 2 Hanging Rock, Stonecoal and Coke	25.00 @ 26.00
No. 1 Southern, Stonecoal and Coke	25.00 @ 26.00
No. 2 " "	24.00 @ 25.00
"American Scotch"	21.00 @ 22.00
Silver Gray	20.00 @ 21.00
Scotch	27.00 @ 28.00

MILL IRONS.

No. 1 Charcoal, Cold-short and Neut'l.	22.00 @ 23.00
No. 1 Stonecoal and Coke, Cold-short and Neutral	21.00 @ 22.00
No. 2 Stonecoal and Coke, Cold-short and Neutral	20.00 @ 21.00
No. 1 Missouri and Indiana Red-short	25.00 @ 26.00
White and Mottled, Cold-short and Neutral	18.00 @ 19.00

CAR WHEEL AND MALLEABLE IRONS.

Hanging Rock, Cold-blast	48.00 @ 50.00
Alabama and Georgia, Cold-blast	45.00 @ 50.00
Kentucky, Cold-blast	43.00 @ 48.00

W. B. BELKNAP & Co., Iron and Steel merchants, Nos. 113 and 115 West Main street, report to us as follows, under date of May 29: A better feeling is clearly manifest all along the line. How much the cheerful tone of last week's *Iron Age* reports has to do with this we cannot say, but long abstinence from buying, curtailed production and very low prices are having their legitimate effect. So to-day, when the dispatches bring news of the puddlers' strike, there is something of an excitement in the market, owing to the anxiety of jobbers and consumers to cover their probable wants for 60 days at figures recently quoted. There is no special apprehension of much higher prices, but the threatened scarcity of complete assortments is enough to beget a quickness and activity in the trade that we have not

felt for three months or more. A lot of Bar and small Rounds raised from the steamer Alice, sunk on the Falls three weeks ago, sold at auction here yesterday at just about 2¢ card, being taken up by the merchant trade. Mud and rust-covered Nails brought as high as $2.50 per keg. Scrap has toned up considerably and is held now at $1 @ $1.15. Many of our shops are shut down for annual repairs; so while local demand is not at its briskest, goods are moving out fairly well for the season. It is probable that both mills here will close down early in the week, as it now seems doubtful if they are permitted to work up what Muck Bar they have on hand.

BALTIMORE.

W. N. WYETH, Iron and Steel Merchant, 46 and 48 South Charles street, reports us the following, under date of May 31: Trade rules about the same as last reported, with a slight perceptible improvement noticeable:

Ref. Bar Iron, 1 to 6 by ⅜ to 1	₩ lb	2½ @ 2¾¢
" " 1 to 4½ by 1½ to 2	₩ lb	2½ @ 2¾¢
" ¾ to 2, Round and Square	₩ lb	2½ @ 2¾¢
Hoop Iron, 1¼ wide and upward	"	3¾ @ 4 ¢
Band Iron, from 1¼ to 4 in. wide	"	3¼ @ 3½¢
Horse-shoe Iron	"	4 @ 4¼¢
Norway Nail Rods	"	6¼ @ 6½¢
Black Diamond Cast Steel	"	13½ @ 14½¢
Machinery Steel	"	9 @ 9½¢
Cast Spring Steel	"	8 @ 8¾¢
Common Horse Nails	"	10 @ 14 ¢
Perkins' Horse shoes, ₩ keg of 100 lbs		$5.12½
" Mule shoes		6.12½

	10	9	8	7	6
Putnam Horse Nails ₩ lb	21	22	23	24	26¢
Globe Horse Nails ₩ lb	20	21	22	23	25¢
Railroad Spikes			3½ @ 3¾¢		

Less list discount to the trade.

R. C. HOFFMAN & Co., Iron and Commission Merchants, report the Pig Iron market as follows, under date of May 31: We have no change to note in the Iron market since our last report. Market quiet at about quotations:

Baltimore Charcoal Wheel Iron	$45.00 @	50.00
Virginia " "	45.00 @	50.00
Anthracite No. 1	26.00 @	27.00
" No. 2	25.00 @	26.00
" No. 3	24.00 @	25.00
" Mottled and White	@	....
Charcoal C. B. Blooms	75.00 @	80.00
" " Billets	75.00 @	80.00
Refined Blooms	60.00 @	65.00

CINCINNATI.

Messrs. E. L. HARPER & Co., under date of May 31, write as follows: A decidedly better feeling pervades the market and prices close at a higher basis. Early in the week Hanging Rock could be picked up in small lots as low as $25 here, and even some round lots changed hands at or a little below this figure. A large demand, however, sprang up, offers for 10,000 tons being made at these rates, but were not considered, and prices speedily reacted, some small sales being closed at $30. The demand continues to improve, the inquiries being general and nearly always resulting in good-sized orders. The XX Furnace is to be blown out, and other leading Hocking Valley furnaces are seriously considering an immediate stoppage, because of the necessary loss in selling at present prices. The quotations below show the range of the market to-day:

FOUNDRY IRON.	4 mos.
No. 1 Hanging Rock Charcoal	$28.00 @ 30.00
No. 1 Southern	24.00 @ 26.00
No. 1 Strong Coke	24.00 @ 26.00
No. 1 Soft Stonecoal	22.00 @ 23.00
No. 1 Open Silver Gray	21.00 @ 22.00
GRAY FORGE.	**4 mos.**
Hanging Rock Charcoal	$25.00 @ 26.00
Neutral Coke	24.00 @ 25.00
Cold-Short	21.00 @ 22.00
CAR WHEEL—MALLEABLE.	**4 mos.**
Hanging Rock, Cold-blast	46.00 @ 47.00
Southern, Warm-blast	40.00 @ 42.00
Lake Superior	40.00 @ 41.00

ST. LOUIS.

Messrs. CARD & HOFFER, Pig Iron and Iron Ore Merchants, 417 Pine street, write us as follows under date of May 29: There is an evident better feeling among the larger buyers and inquiries are resulting in business. We quote:

HOT BLAST CHARCOAL.	
Missouri	$28.00 @ 30.00
Southern	24.00 @ 26.00
Hanging Rock	25.00 @ 28.00
COKE AND COAL.	
Missouri	None offering
Southern	24.00 @ 25.00
Ohio	23.00 @ 25.00
MILL IRONS.	
Cold-short	22.00 @ 24.00
Red-short	27.00 @ 28.00
CAR WHEEL IRONS.	
Missouri	43.00 @ 48.00
Southern	45.00 @ 50.00
Ohio	50.00 @ 55.00
IRON ORE.—NOMINALLY.	
Ore for fix	10.00 @ 12.00
For furnace	6.50 @ 7.50
Brown Hematites	no market.

RICHMOND.

Mr. ASA SNYDER, Iron Merchant and Furnace Agent, writes as follows under date of May 31: A fair demand exists on the basis of these quotations:

Scotch Pig Iron, according to brand		23.00 @ 28.00
Am. Scotch Pig Iron " "		27.00 @ 30.00
American No. 1 " "		25.00 @ 28.00
" No. 2. " "		23.00 @ 25.00
" No. 3. " "		22.00 @ 24.00
Am. Mot. and White " "		20.00 @ 22.00
Cold-blast Charcoal, " "		42.00 @ 45.00
Warm-blast Charcoal " "		31.00 @ 34.00
Old Rails		25.00 @ 27.00
Wrought Scrap No. 1		22.00 @ 24.00
Cast Machinery, No. 1		20.00 @ 22.00
Richmond Refined Bar Iron, Stand'd.		2.6 @ ....
Horse Shoes, Tredegar		.... @ 4.50
Mule " "		.... @ 5.50
Old Dominion Nails, (standard size)		.... @ 3.00

For lots of 200 kegs, 10¢ per keg less.

NEW ORLEANS.

Messrs. MINNIGERODE & Co., dealers in Railway Supplies, 61 St. Charles street, write as follows under date of May 28: The events of the past week have confirmed us in the opinion expressed in our last letter—that the market had about reached the lowest point in the decline. This opinion is not shared by the majority of our correspondents, but we judge more from actual transactions than from individual opinions. In our market there has been a decided improvement over the prices of two weeks ago in both Old Rails and Pig Iron. The prices on finished Iron have remained unchanged, but trade has been active, and holders will need no incentive to regulate prices in sympathy with greater firmness in raw material. The inquiry continues much more brisk than for many weeks past. There is still, in most instances, a wide difference between buyers and sellers, but the sellers appear to feel the greater confidence.

Our English Letter.

Review of the British Iron, Steel, Metal and Hardware Trades.

(From our Regular Correspondent.)

LONDON, ENG., May 17, 1880.

THE TRADE OUTLOOK

has not become much brighter since the date of my last letter. In a few instances there has been a little more business done, but it is assumed that the near approach of the Whitsuntide holidays and the consequent desire of the men to make "a good week," may have more to do with this than any legitimate augmentation of work arising out of additional orders. The Whitsuntide enjoyments begin to-day, which is Whit Monday, the principal and best kept holiday of the whole year. At one time the festival was almost entirely one of the Northern and Midland districts of the country, but since the establishment of bank holidays, the day has been equally well observed in London and the South of England generally. Falling as it mostly does at a time of year when vegetation wears its most beautiful spring aspect, Whit Monday possesses many attractions which the other holidays lack—hence it has become the chief out-door day of the year. On this occasion it falls unusually early in the season, but the weather is so fine and the flowers, &c., are so forward that everything favors the non-observance of business. As a matter of fact, the city of London proper—into which over a million persons go each morning and return each evening—is to-day an absolute desert. All the offices, banks, and other business places are closed, and their habitues are on pleasure bent. The bank holidays are now so universally observed that they are not only void of business, but also of pleasure to those who are quietly disposed, and who are not possessed of a burning desire to immolate themselves among the crowds at the theatres, or any of the 250 railway stations of this huge metropolis. In all the principal iron and hardware producing districts the present week will be a broken one. Give one day as a feast to the British workman, and it may safely be assumed that he will take two or three days more in order to make his carouse a thorough one. In Birmingham, Manchester, Sheffield, Leeds, &c., to-day is celebrated for its annual gatherings of Sunday-school children, but, in most places, there are also "feasts" or "fairs," which prolong their miserable and antiquated existences during the greater part of the week. These afford ample excuse for the men to "go on the loose," hence it is clear that the greater part of the week will be wasted. In some senses the restriction of production thus effected may not be without its uses, but where such limitation would be of most service it will be wanting. The blast furnaces, for instance, will be kept going, not only in Scotland (where Whitsuntide is not observed) but in this country. Thus pig iron, the abundance of which is the bugbear of the trade, will suffer very little by the interval, while, on the other hand, the mills and forges will lie idle. Could the reverse effect be brought about, the result would certainly be happier. It is becoming more clear day by day that nothing will save prices from going still lower but a considerable and honest reduction of the production. In all directions the make is infinitely beyond the requirements of consumers, and stocks are increasing to an extent never before known. It is asserted, indeed, that if the whole of the furnaces in Scotland could be laid idle for three or four months there would be no scarcity whatever of that class of iron. Such a step is, of course, out of the question, but the mere fact of such a statement being possible is startling, and calculated to shake one's faith in the favorable prophecies which are being uttered and circulated with respect to the immediate future of our iron industries. Up to the present time there are few signs of the ironmasters having the courage to adopt the means necessary to save themselves and their *confrères* from absolute ruin. They seem content to go on piling up iron in their yards and in the official warehouses, apparently on the speculation that "something will turn up," in the vein peculiar to the late Mr. Micawber, of lamented memory. All accounts from the United States point to the conclusion that nothing is to be expected from your market; yet I have no doubt that many of the Scotch ironmasters still hunger after your orders, and really believe that by some lucky fluke or other their iron will still experience a sale on your side. It is of little or no avail to urge upon these gentlemen the utter improbability of there being any revival in your demand worthy of being mentioned. They have tasted blood, and that so lately, that they are athirst for more. Such being the case, it is clearly most difficult to say how long the infatuation may last. So long as the feeling does obtain, we are pretty certain to witness low prices, seeing that no other foreign market is likely to send orders sufficient to compensate for the loss of your demand. This is especially the case with Scotch pig, which is not now so generally used as was the case at one time. The Sheffield and other stove founders, for instance, use but small quantities of Scotch brands, having nearer to hand Derbyshire pigs at lower prices, which fully answer all their ordinary requirements. In Germany, as your columns have lately shown, some of the native pigs are almost equal to Scotch, which, with other similar facts, renders it quite a question whether the future of the Scottish smelters is entirely hopeful. Australia and other new markets, it is true, are growing customers, but it will be long before these countries will operate as equivalents for the loss of your great market. Cleveland is in a different position. Its pig is exceedingly low-priced; it has special facilities for cheap shipments coastwise as well as foreignwise, and the quantity is sufficiently good for most ordinary purposes. The effect of these points of advantage is apparent, even at the present time, for the Cleveland ironmasters are not only sending large consignments abroad, but they are also extending their business with Scotland itself—the result of the utilization of both these channels being seen in a steady decrease of stocks in the teeth of the very large production. Passing on now to the hematite branches of the smelting industries, a singularly contradictory state of things exists. With most of the producers heavily sold forward at good prices, and stocks at an excessively low ebb, quotations in the open market have descended to the extent of 100 per cent. within three months, so that whereas some of the sales of January and February were on the basis of £7. 10/ @ £8 per ton, the same brands are now to be had (from second holders mostly) at £3. 10/ @ £3. 15/! New orders are scarce, and makers themselves will presently be in the field. At present they decline to enter into contracts for more than a month's forward deliveries, believing, they say, that by midsummer all the brokers will have cleared out their holdings, and that the general state of the trade will thereafter move up an inclined plane. Taking a parallel view, some of the Bessemer works are replenishing their stores very freely, in spite of the terrors of dephosphorization and more ordinary contingencies. One well-known Sheffield house, the senior partner of which is commonly reported to possess unlimited pecuniary resources, has, within the past fortnight, bought many thousands of tons of these pigs at a price well within £4 per ton. Coming to the manufactured iron departments, there is little that is new to report. Most of the mills and forges are much slacker than they were a short time ago. Some of them have again set down their plant and discharged their men, while the workmen who are kept on are being asked to accept reductions. New orders are alarmingly scarce for bars, although sheets, strips and hoops, it is stated, are still being made on United States account in Staffordshire, as well as for the hardware manufacturers. On the whole, nevertheless, finished iron must be pronounced very dull, with prices which are purely and absolutely nominal.

SCOTCH PIG IRON

is conspicuous by its dullness and entire want of mobility in prices and turnover. The shipments, which had been pretty well kept up, have now fallen off to the extent of 50 % per week, and there are no new orders in the market likely to yield anything approaching to the former returns. Statistically, Scotch pig is growing worse each succeeding week. There are now 441,471 tons in Connal's stores—an increase during last week of 2290 tons, and an increase of 180,000 tons since Christmas last. Stocks in makers' own yards are said to be small, but the term is so elastic that it may turn out that there are 250,000 tons in their hands, besides the quantity in the official stores. There are 114 furnaces blowing, of which a few are temporarily damped down, owing to wages disputes, some of the ironmasters having served notices of reductions. The total shipments to date have increased 102,391 tons over those for the corresponding period of 1879. Ballast pig is 45/ per ton, and freights are liberally "anyhow" and anything between 7/6 and 11/6 for steam or sail to your Eastern ports. Cleveland pigs are being more largely imported into Grangemouth, over 5400 tons having been so sent last week, which is a much heavier tonnage than has been disposed of latterly in that direction. James Watson & Son report a very dull market at Glasgow, and John E. Swan & Bros., Limited, give the subjoined particulars of prices, &c., in Scotland, under date of May 14th:

LANARKSHIRE BRANDS, FREE ALONGSIDE SHIP AT GLASGOW.

Brands.	No. 1.	No. 3.	No. 4.
Gartsherrie	63/	48/	....
Coltness	57/	51/	....
Langloan	55/	52/	....
Shotts, Ordinary	56/	52/6	....
Calder	51/6	47/	....
Summerlee	52/6	48/	51/
Chapelhall	51/6	....	....
Carnbroe	53/	49/	51/
Clyde	48/	45/6	....
Quarter-Clyde	47/6	45/6	48/
Govan	47/6	45/6	....
Monkland	47/6	45/6	50/

Warrants, 3-5 No. 1; 2-5 No. 3, g. m. b. f. o. b. Glasgow 46/4

AYRSHIRE BRANDS, FREE ALONGSIDE SHIP AT ARDROSSAN.

Glengarnock	53/	49/	51/
Ardeer	53/	49/	51/
Eglinton, Lugar, Muirkirk, Portland (Branded Eglinton)	48/	46/	...
Dalmellington	48/	46/	49/

EAST COAST BRANDS, FREE ALONGSIDE SHIP IN THE FORTH.

Carron, Selected	52/6	....	....
Carron, Ordinary	50/	47/6	....
Almond, Export	50/	....	....
Almond, Home use	48/	46/	....
Kinneil	....	47/	....

Furnaces in blast in Scotland, May 14, 1880, 114; May 16, 1879, 87.
(Producing about 23,710 tons per week.)

CLEVELAND PRICES

are currently somewhat nominal at the following figures:

No. 1 Foundry	42/6	No. 4 Forge	37/6
2 "	40/	Mottled	37/
3 "	37/6	White	36/6
4 "	37/6	Kentledge	47/6

It may possibly interest some of your producers to learn that coal is now to be had in the North of England at 5/ @ 7/6 per ton; coke at 11/ @ 14/; iron ore at 6/ @ 9/ for common, and 14/ @ 17/ for hematites; puddlers' wages being 8/3 per ton, and limestone for fluxing almost nominal. The fixed charges do not vary much from your own similar interest. From these data you will be enabled to compare cost of producing pig iron here and on your side. Statistics have been issued showing the average monthly output of different sorts of iron in Cleveland over a series of years. They are as under:

	Rails Tons.	Plates Tons.	Bars Tons.	Angles Tons.
1875	20,000	14,400	8,400	3,400
1876	8,900	14,300	7,300	4,400
1877	3,000	17,800	6,400	5,500
1878	1,800	19,400	6,500	7,300
1879	560	14,400	5,000	4,000
1880	2,400	23,853	6,226	5,486

It is thus apparent that the sheet anchor of the Northern district is plate rolling; the revival of rail making being purely ephemeral.

THE BOILER EXPLOSION,

which took place on Saturday morning at the Birchill Hall Iron Works, near Walsall, affords an apt corroboration of the axiom that some fearful disaster invariably heralds the approach of all the chief holidays of the year. No Christmas, for instance, ever passes without a great railway accident, shipwreck or other terrible incident, with much loss of life, and the summer holidays are with equal certainty attended by some untoward incident. Our latest Christmas was accompanied by the Tay Bridge collapse; now we have Whitsuntide with a boiler explosion, in which 25 persons are said to have been killed, and 60 others more or less seriously injured. I am writing without full details of the catastrophe before me, but I gather that the boiler was one of a set of three verticals which generated steam for the furnace engines. The explosion took place between 10 and 11 in the forenoon when the day shift of 150 men were in the works, and the fragments hurled about with inconceivable velocity inflicted the results mentioned above. Great damage was done to the premises, two boats laden with pig iron being sunk in the canal close by. It is stated that Mr. Harrison, the engineer of the place, is among the killed. It is also stated that the boiler was almost a new one, and that it was under the inspection of the Manchester Boiler and Steam Power Insurance Society. If this latter statement be true, the cause of the accident will no doubt be carefully ascertained, seeing that no one has done more to minimize boiler accidents than Mr. Lavington Fletcher, the energetic engineer of that society. If the boiler really was in charge of this gentleman's inspectors, it would seem to be certain that carelessness or oversight must have been the prime cause of the disaster. The monthly reports of the Manchester Society show that where the construction of boilers is reputable and inspection regular, accidents are exceedingly rare. It is always possible to cause an explosion by neglecting the water supply, by overheating the flues or by wedging down the safety valves, and no amount of inspection can obviate disaster if common sense be not utilized by those in charge. I shall, therefore, look for the official investigation and report in this case with more than ordinary interest, chiefly owing to the allegation that inspection has been regular. I think it is fair subject for comment that one reason why many of these so-called "accidents" happen just prior to holiday periods, is the fact that the men try to *overwork* themselves and the machinery, for the purpose of compensating in advance for the subsequent abstention. Coupled with this there is also the circumstance that repairs are commonly done during the holidays, so that even if a boiler shows signs of going wrong some time before, there is an effort made "to make it do" until the idle time comes round. I do not say that this is so in the instance under notice, but mention the matter as possible information and warning to steam users among your own readers.

WEST COAST HEMATITES

continue to grow easier, and are now on offer at rates which seem inclined to drop even still lower. They are:

Hematite.	No. 1.	No. 2.	No. 3.
Cleator	97/6	96/6	95/
Lonsdale	70/	69/	68/
Workington	70/	69/	68/
West Cumberland	70/	69/	68/
Lowther	70/	69/	68/
Moss Bay	70/	69/	68/
Harrington	70/	69/	68/
Solway	69/	68/	67/
Maryport	69/	68/	67/
Askam	69/	68/	67/

The figures vary 1/ @ 2/ per ton, according to the port of shipment. The whole of the Cumberland and Furness furnaces are running "full time" on ores raised in the immediate vicinity, with some slight importations from Ireland. The hematite furnaces on the northeast coast are using Spanish and Elban ores, which are being brought into the Tees in great quantities. The Wigan Coal and Iron Company mostly use Algerian ores from the Messelmoun mines, while in South Wales and Monmouthshire, Spanish ores from Bilbao and Somorrostro are mixed with those from the Forest of Dean or used pure. It is stated that shipments of hematite pigs continue to be made from Middlesboro', Barrow and Cardiff to your ports. Do these consignments go into store?

FROM SHEFFIELD

there is no news of any special importance. If that nation is happy which has no history, then Sheffield, as a town, ought just now to be in a somewhat parallel position. The iron works do not yield any incidents of note, nor do the Bessemer establishments appear so brisk as they were earlier in the year. Prices continue to grow easier in all directions, and neither sellers nor buyers care to move on a scale of any importance until they have some assurance that "hardpan" has been reached. The cast and converted steel makers are fairly well engaged, much of their total production being in fulfillment of orders from the United States and Canada. The electroplaters are fairly well engaged—notwithstanding published reports to the contrary—and there are few cutlery manufacturers of any note who are in want of employment. The file trade is in actual activity, it being stated that not a single respectable workman in this branch is out of work. Sheep shears, picks, and several sorts of edge tools are also in very encouraging request. I understand that Mr. David Ward (of Ward & Payne) is about to proceed to the Melbourne exhibition in order to look after his Australian friends.

STAFFORDSHIRE AND BIRMINGHAM

have not changed in any material degree, either as regards iron or hardware. All grades of iron, whether crude or finished, continue weak and devoid of vitality. The list price of marked bars remains at £9, but it is an open secret that cash or good credit buyers can make almost their own terms for prompt deliveries. Ordinary and third-rate bars can be had at £6. 5/ @ £7. 10/, with sheets and other sorts in proportion. Pig iron is so abundant that several furnaces have been laid off. It will require an abnormal state of trade to galvanize the whole or a majority of the South Staffordshire blast furnaces into renewed activity. The hardware, &c., manufacturers are feeling the pinch of the shoes, and in several lines are lowering prices or increasing discounts. Wire, certain sorts of stamped goods, hollow ware, and metal products all cheaper. A Birmingham manufacturer is said to have just booked an order for 4000 picks for South Africa, and others have among them orders for 20,000 wire dish covers for export, mostly for Australia. Wire nails have also come into extraordinary request, chiefly for Southern export markets.

FOREIGN.

FRANCE.

(Moniteur des Interets Materiels.)

PARIS, May 16, 1880.—*Metals.*—The weather has become milder, and, with improving crop prospects, confidence is reviving in commercial circles. Metals have been irregular, and with few exceptions have declined still further. *Copper.*—The market has been weak. We quote at the close: Chili Bars, 148.75 @ 151.25 francs the 100 kilos.; Ingots and Slabs, 157.50, and Best Selected, 165; pure Corocoro Ore, 160. *Tin.*—There has been quite a drop. We quote: Banca, 212.50; Billiton, 208.75; Straits and Australian, 207.50, and English, 213.75. *Lead* has given way 2 @ 3 francs. We quote the same, 37 @ 38 here and at Havre. *Spelter* is also lower. We quote here and at Havre, 51 @ 52. In *Iron* there has not been much of a change. Flooring Iron is well sustained at 25 @ 25 50 francs. This is less the case with Merchant Iron, of which sales have been effected direct to consumers at 24 francs. Sheet Iron is firm at 30. Old Rails are less depressed in value than might have been supposed, for there are still purchases of them at 13.50 francs at the works. Meanwhile most people in the Iron trade seem determined not to enter upon new engagements in either direction so long as the outlook remains doubtful. Makers are, on the whole, firm, but dealers and consumers proceed with extreme caution. There is a good deal of building again going on in this city and suburbs, a great deal more than had been believed would be the case, thus buoying up holders in this vicinity. Mr. Prosper Henry, owner of a forge at Charleville, in the Ardennes, has bought the Brundage patent for France and Belgium. The *Bulletin* of the Committee of Forges has just published the movement in our foreign Iron and Steel trade. During the first quarter the import is 13 % in excess of the same period in 1879, and the export 12 %. The import of Iron ore has been 220,542 tons, against 215,776 in 1879, and the export 17,739 tons, against 13,563. These statistics consequently show increased activity in all directions. From Spain the import of Iron Ore has been only 45,076 tons, against 54,454 tons last year; this falling off is probably due to the great demand for Spanish Ore and the notable rise which has taken place in it there. *Coal* has remained excessively dull, but in the North and the Pas-de-Calais Coal for industrial purposes has been in good demand; this is, however, likely to undergo a change if the strikes in the textile manufacturing districts of Normandy do not soon come to a close. A compromise between employers and operatives seems to be at hand, however.

BELGIUM.

(Revue Universelle.)

BRUSSELS, May 16, 1880.—*Iron.*—We are glad to say things have been slightly looking up here, and confidence seems to revive a little. There is not much liveliness, it is true, but the return to greater firmness is daily becoming more decisive, so much so that it looks as though we were approaching a fresh revival. The basis of 150 francs for Merchant Iron is successfully maintained. Affinage Pig Iron remains steady at 70 @ 80 francs. Moulage No. 5 is selling at 90 francs, with the usual difference between numbers of 2.50 francs. There has been an increase of orders. The only serious drawback is the lack of activity in Architectural Iron. Steel and Sheet Iron are in good request. On June 15 the national festivities in celebration of the fiftieth anniversary of Belgian independence will commence in this city, and preparations for the same absorb the attention of a great many people, including many business men. We need not, therefore, look for much activity in commercial circles during the next month or two, in consequence of the many visitors from neighboring countries, who will have to be attended to. *Coal* has been a little livelier, and prices have been sustained. At Charleroi a great deal of Coal will be wanted, and industrial Coal is in consequence thereof quite steady. Different it is at Liege, where there is plenty of stock; aside therefrom both working hours and wages have been reduced at the latter place.

GERMANY.

(Borsenhalle.)

HAMBURG, May 14, 1880.—*Iron.*—Our Dortmund correspondent expresses himself about the Iron situation there to the following effect: 'The aspect of the Iron market in this vicinity is getting worse daily. The downward tendency is becoming more irresistible week after week. A good many rolling mills have but few orders left, and compete energetically for the few that may still occasionally be picked up. Consumers of course avail themselves of this state of affairs and beat down prices with the greatest ease. The blast furnaces are fortunately better situated than the rolling mills, with the exception of those in the Siegen district, which are small, and work from hand to mouth. The consequence is that these latter smaller furnaces are now selling puddle Iron below 75 marks in this city. We quote Boiler Sheets, 245 @ 240 marks; second quality Sheet, 235 @ 230; and Merchant Iron, 160 @ 150 marks the 1000 kilos at the works." We receive the ensuing from Upper Silesia: "The rolling mills begin to complain of a lack of orders; they, nevertheless, keep up a show of firmness, but make rebates of 4 @ 6 % afterward, when actual business comes to pass." *Metals.*—There has been no change in the dullness which has characterized the past few weeks. Lead is without change; English and German, 17.50 @ 18 marks the 50 kilos; Manufactured, 18.20 @ 18.50; Spanish Pig, 18.50. Copper is lower; Swedish, 72 @ 76; English, 65 @ 66; and ditto Sheathing, 78. Tin unaltered. We quote at 80 @ 89. Spelter is quiet at 19.50; Sheet Zinc, 27 @ 27.25.

AUSTRIA.

(Austrian Trade Journal.)

VIENNA, May 16, 1880.—*Iron.*—There has been no particular change in the Austrian Iron market during the week under review. Both consumers and dealers are holding back; the works at the same time maintain officially the old January figures of their combination. The fact is everybody pins his hopes upon the splendid crop prospect; the works seem to be of opinion that, in a couple of months, in this country at least, the abundance of cheap food will create a healthy and lasting revival in all branches of trade, including the Iron, implement and hardware branches. Another element of approaching strength is the decision obtained as to the branch railroads to be built, which is a most important matter, inasmuch as now, at least, these lines will be taken in hand without further delay. It seems to us pretty clear that the Iron prospect is tolerably promising in this country under the circumstances. Meanwhile the dealings in Pig and Wrought Iron have been to a moderate extent only. There is more doing in the Northern provinces than here. We quote at Vienna Pig, 60 @ 63; Gray do., 65 @ 67; Bessemer Pig, 68 @ 70; at the works, Merchant, 135 @ 145; Sheet, 135 @ 185. *Metals.*—The market here has been flat, and the fluctuations have been more nominal than otherwise, in response to quotations at London. We quote Copper, 80 @ 103; Old do., 72 @ 76; Tin, 109 @ 110; Antimony, 94; Lead, 22.50 @ 23; Shot, 29; Spelter, 24 @ 26; Sheet Zinc, No. 9 to 26, 32; Gun and Bell Metal, 80 @ 100; Brass, 45 @ 65; Nickel, 97 8, 5.50 florins per kilo.; Minium, 30.50.

HOLLAND.

(Koch & Vlierboom.)

ROTTERDAM, May 18, 1880.—*Tin.*—The general tendency has been a drooping one. It has been interrupted for a moment, but has since made progress again. Banca may be had at 45.75 guilders the 50 kilos., and Billiton at 45.50. *Lead* is also lower. Stolberg has been done at 8.87½, and other brands may be had to arrive at 8.75 guilders.

CHILI.

(Ferrocarril.)

VALPARAISO, April 9, 1880.—*Copper.*—When the holy-week holidays had been gone through, purchasers only offered $18.75 @ $18.85, but on the receipt of more favorable cable news they paid as much as $18.87½ @ $19, and gradually, up to yesterday, prices kept up steadily, reaching $19.50. This is while London cables Chili Bars £64. Of Regulus 20,000 quintals were taken at $8.75. No ore has been sold. We quote the same nominally $3.50. Total sales of bar Copper, 6877 quintals. *Nitrate.*—Two cargoes Tocopilla, with 4/6 freight, sold during the past fortnight at $3.77 for 95 %, and on the 3d inst. the government offered 100,000 quintals at auction, limiting the same at $3.60. Only $3.51 being offered, the sale was stopped, and the government resolved to ship the lot at 3/6 freight. Meanwhile, a cargo of Taltal brought $3.70 for 96 %. Total sales, 41,000 quintals. *Exchange.*—60 days on London, 31⅞d.; 90 days, 32d.

EAST INDIES.

(Rautenberg, Schmidt & Co.)

SINGAPORE, April 14, 1880.—*Tin* has declined uninterruptedly and finally closes weak at $27 per picul. *Exchange* firm at 3/10¾ for six months' sight on London, and at 3/9⅞ for four months' bank bills.

(Schmidt, Kustermann & Co.)

PENANG, April 16, 1880.—*Tin.*—The market opened at $28.30, at which rate 800 piculs were taken for European account, but since, in consequence of the unfavorable cablegrams from Europe and America, prices have given way uninterruptedly, sales having been made even as low as $25.80 and lower. Sales of the fortnight sum up 2800 piculs for Europe and America, and 1600 piculs taken for India and China by Chinese at the close. While writing, we hear that the latter have still taken 400 piculs at $26, which is the closing figure. The unsold stock in bazar is estimated at 2500 piculs. *Exchange* has been steady and firm all along. We quote four months' sight bank bills 3/9⅝.

(Gilfillan, Wood & Co.)

SINGAPORE, April 20, 1880.—*Tin.*—The demand is limited; a sale was make last week at $26.25 per picul, but buyers now offer lower prices, and we think a further decline is only a question of time, unless the American demand revives, of which at present there is no sign. Exports from the Straits to the United States, so far this month, have been 330 tons, all by steamers *via* London. *Freights.*—There have not been many arrivals of vessels in search of employment, and the immediate result has been an advance in berth rates of 2/6 for London; deadweight now brings 35/, but, as a cargo is not offering freely, we doubt if the advance will hold. For New York the Romeo has taken the berth at 30/ for deadweight. The Leading Wind is now full, and will sail to-morrow. Cargo is scarce. For Boston the T. A. Gooddard has been chartered on secret terms. *Exchange* is steady at 3/10⅜ @ 3/10½ for six months' sight credit drafts.

METALLURGICAL NOTES.

STEAM FOR COMPRESSING STEEL.

We notice that during the discussion of a paper presented by Mr. Anderson, accompanying M. Chernoff's article on the structure of steel, Mr. Anderson, of Erith, stated that the method of casting ingots under steam pressure was really due to the Terrenoire works, and not to American, having been in use at Terrenoire for a considerable time. The facts in the case are these: In 1878 experiments were made at Chaléassière, in France, to produce round castings by the use of steam, a method which was then claimed as a novelty. At that time, and, in fact, before it, Captain Jones, of the Edgar Thomson Steel Works, had taken out patents in France for the method described, and there can be little doubt of the priority of his invention. We may add that to him is due the great credit, in addition, of having been the first to make the method a practical success.

PROPERTIES AND MANUFACTURE OF OPEN-HEARTH STEEL.

Dr. Kollmann, engineer at Gutehoffnungshuette, Germany, has contributed to the *Verh. d. Ver. z. Beförd. d. Gewerbfl.*, a valuable paper on the properties and the manufacture of mild open-hearth steel, from which we take the following: It is possible, he states, to produce, in the open-hearth furnace, steel, or, as Herr Kollmann appears to prefer calling it, "ingot iron," which is completely homogeneous, possesses a tensile strength ranging from 28.57 tons down to 24.14 tons per square inch, and does not harden more than ordinary wrought iron. It is difficult to draw the line where hardening ceases, and even wrought iron will, to a certain degree, harden. Practical tests relating to this matter vary widely. Herr Kollmann has made some experiments with Bessemer metal, open-hearth steel and ordinary wrought iron, bars of which, 0.43 inch in diameter, he heated to strong cherry red and then hardened in water, kept at a temperature of 77 degrees. The mechanical tests made with the hardened and unhardened specimens yielded the following results:

Mechanical Test.	Mild Bessemer.		Open Hearth.		Wrought Iron.	
	Not hard.	Hard.	Not hard.	Hard.	Not hard.	Hard.
Elastic limit, tons	24.13	26.92	18.03	19.17	16.25	17.27
Ten. str'gth, tons	32.38	35.74	26.86	27.68	24.19	24.95
Elongation, per cent	23.00	18.00	32,50	28.00	20.00	16.00
Contraction, per cent	46.00	33.00	68.00	56.00	37.00	29.00

A comparison of the specimens not hardened will show that the open-hearth steel is by far the most homogeneous and the toughest, and that ordinary wrought iron is affected by hardening, the elastic limit and the tensile strength increasing somewhat, while elongation and contraction of area are decreased, in a measure very nearly approaching that observed with open-hearth steel, while the difference between the hardened and the not hardened product is more pronounced, so far as Bessemer steel is concerned. Herr Kollmann has found, by additional experiments, that open-hearth steel having a tensile strength above 29 tons per square inch will harden, and he appears inclined to draw the line between "ingot iron" and steel at or near this point. He holds that the physical properties of these materials are largely governed by their chemical composition, and compares open-hearth metal which may be readily welded, and having a tensile strength of about 26.50 tons per square inch, to mild Bessemer steel, which cannot be welded, and has a tensile strength of 33 tons per square inch. Analysis reveals the following differences:

	Op. H. Steel.	Bess. Steel.
Carbon	0.08 to 0.12	0.20 to 6.20
Silicon	trace to 0.01	0.10 to 0.40
Manganese	0.30 to 0.45	0.50 to 0.70
Sulphur	0.03	trace to 0.06
Phosphorus	0.07 to 0.11	0.07 to 0.12

Herr Kollmann has come to the conclusion, after a large number of comparative welding tests and analyses, that in ordinary wrought iron, Bessemer and open-hearth metal welding will be accomplished with greater facility by keeping silicon and manganese low, other conditions being equal. He is careful to state that, when referring to metal which is capable of being welded, he means one which will be equal in this respect to ordinary wrought iron when worked by an ordinary blacksmith without sand, borax, &c. He states that, so far as Bessemer steel is concerned, only one case has come under his observation in which this could be attained, and refers to the following analysis of this (a Swedish) steel as bearing him out in his conclusions in regard to the most favorable chemical composition: Carbon, 0.16 per cent.; silicon, 0.04 per cent., and manganese, trace. The same he believes, contrary to the opinion expressed by some eminent authorities, holds good for wrought iron also, and he points to some interesting experiments to sustain his position. At Gutehoffnungshuette they have been testing a method for dephosphorizing iron in the puddling furnace. The process consists in adding cinder as high as possible in lime and manganese. In many respects the results have been favorable. Forty per cent. of the phosphorus was eliminated, and the quality of the product, so far as the tensile strength, elongation and contraction of area were concerned, were improved. A drawback to the process, however, was that the wrought iron made retained more silicon than usual, and could not be welded as readily as appeared desirable. We may add that it is thought that the use of more elevated temperatures is expected to remedy this evil. Phosphorus is claimed to improve the welding of iron, while manganese, if present in quantities excluding 0.4 per cent. and more than 0.05 per cent. of sulphur, appears to affect it seriously. Carbon, as long as it remains below 0.20 per cent., does not injure the welding power of the metal.

Seven welding tests are made with every charge of the open-hearth furnace at Gutehoffnungshuette, the result being such as to establish the quality of the product in this respect. The following may be cited as an instance:

	Tens. Str.	Elong.	Contr.
Rod not welded	31.43	28 %	63 %
Welded together (butting)	30.73	14.5 %	25.4 %

Rupture did not take place at the weld.

Herr Kollmann gives a number of details on the manufacture of this product which will be of interest to American steel makers. He states that the gas flue is frequently, in modern practice, placed above ground, and sometimes the cooling apparatus is omitted, the gas being taken to the furnace by a short canal. It is said that much success has attended the efforts made at the Asthöver works at Annen, near Witten, Germany, to replace the Siemens furnace by the cheaper Bicheroux system. For making steel possessing a tensile strength of 28.5 tons, a contraction of area of 65 per cent. and an elongation of 33 per cent., the following materials are used at Gutehoffnungshuette:

	Lbs.
Oberhausen Bessemer pig	882
Bessemer ingot scrap	6,614
Bessemer sheet scrap	2,205
Best sheet iron scrap	1,323
Total	11,024

A final addition of 1 to 3 per cent. of ferromanganese, holding 60 per cent. of manganese, is made. It would not be possible to produce the necessary quality of mild and weldable steel by the use of spiegel. All the materials are added simultaneously with the exception of the sheet iron scrap, which is put in gradually as may be required. The following analyses will convey an idea as to the nature of the materials used:

	Bessemer Pig.	Ingot Scrap.	Sheet Steel.	Sheet Iron.
Carb.	4.05	0.19 to 0.23	0.16 to	tr. to 0.03
Silicon	1.96 to 2.50	0.10 to 0.40	0.10 to 0.20	trace
Mang.	2.50 to 3.50	0.50 to 0.80	0.50 to	.....
Phos.	0.06 to 0.08	0.08 to 0.10	0.08 to 0.010	0.02
Sulph.	0.02 to	trace	trace	.....
Copp'r	0.03 to	trace	.....	.....

The following are two analyses of the ferromanganese used:

	I.	II.
Carbon	4.05	4.73
Silicon	0.14	0.17
Phosphorus	0.20	0.20
Sulphur	tr.	tr.
Copper	0.02	0.02
Manganese	60.00	45.00

If nothing were eliminated during the process, the bath of metal would contain:

Carbon	0.497	Sulphur	0.016
Silicon	0.480	Manganese	0.860
Phosphorus	0.089	Copper	0.002

After seven to eight hours, when the charge has reached the highest temperature and is boiling strongly, the composition is as follows:

Carbon	0.06	Sulphur	0.02
Silicon	0.10 to 0.15	Manganese	trace
Phosphorus	0.09	Copper	none

When this stage is reached, it becomes necessary to eliminate the silicon completely, in order to make the product capable of being welded. This is done by adding about 600 pounds of rich Mokta ore and stirring thoroughly. The result is that the metal contains the following:

Carbon	0.03 to 0.05	Sulphur	0.02
Silicon	trace	Manganese	trace
Phosphorus	0.09		

The 154 pounds of 70 per cent. ferromanganese are added, which, if there was no loss, would produce metal holding:

Carbon	0.113	Sulphur	trace
Silicon	0.002	Copper	trace
Phosphorus	0.091	Manganese	0.83

When cast, however, the steel is found to contain:

Carbon	0.08 to 0.12
Silver	tr. to 0.01
Phosphorus	0.09
Sulphur	tr. to 0.03
Manganese	0.30 to 0.45

Therefore, 0.38 per cent. of manganese enters the cinder during casting. It is on account of this facility in entering the cinder on the part of manganese, that after thoroughly mixing it with the metal, the latter must be tapped as rapidly as possible. Whenever the tapping lasts longer than usual, owing to any accident, more ferromanganese must be added, thus eventually rendering the steel harder. It is not possible, on a large scale, to make steel quite free from manganese, and thus to produce even milder quality.

The production at Gutehoffnungshuette is 2 to 3 five-ton charge per 24 hours, the furnace outlasting 30 to 120 charges, according to its construction and the quality of the refractory materials used. The waste varies from 3 to 8 per cent., according to the raw materials used. The consumption of fuel foots up to 40 to 70 per cent. by weight of the production.

THE OPEN-HEARTH PLANT AT SPRINGFIELD.

It will be remembered by the readers of *The Iron Age*, that the combined Krupp washing and Pernot open-hearth steel process was adopted some time since at Springfield, Ill. The plant, which has been put with every labor-saving device which modern metallurgical engineering could devise, has now been in operation for some time, and the results thus far obtained certainly encourage the expectation of the managers of the works that one of the two 15-ton Pernot furnaces will be capable of turning out in 24 hours 100 tons of steel. With cold pig and cold scrap, 24,000-pound heats have been made in four hours, and 40,000-pound heats in eight hours. The only difficulty experienced with the furnace so far is the rapid wear of the side lining of the hearth. In 17 hours from the tapping out of the charge the hearth has been run out, its lining entirely replaced and again run in under the roof, a part of which had meanwhile been renewed.

Pneumatic Clocks in Cities.

The latest Parisian novelty is the introduction of arrangements for obtaining exactly uniform time through every part of the city. Passing along the Boulevards, you see, at brief distances from each other, huge clocks planted in the center of the street, facing in four directions, and brilliantly lit up, after sunset, with gas. These boulevard "horologes" are specimen *avant couriers* of a new system of pneumatic clocks which are rapidly finding their way into the public offices, the stores, the banks and mercantile offices, and the hotels and private dwellings of Paris.

The clocks are worked from a common center, and give the same identical time in all parts of the city, being regulated from the Public Observatory. To supply the whole of Paris, three or four central clocks are required, designated "Directing Normal Clocks." These are placed at convenient centers and connect with the ordinary or "Reception Clocks" of their system or district. Each of these central clocks is connected with a system of pipes, including, first, those running through principal streets; next, those branching therefrom into the minor streets; next, those running from the streets into the buildings; and, finally, smaller ones running as required in the interior of the buildings.

The central clocks are provided with a small engine, worked by steam or gas, which every minute sends a pulsation of compressed air through the entire system of pipes and acts upon every clock in the circuit, advancing the hands on the dial of the clock by one minute. The clocks are of the simplest construction possible. They cost but a trifle, and the company either furnish them free of charge, got up in a variety of handsome designs, or place their own works in clocks already owned by those who desire the service. The pipe attachments are got up in good taste, and their introduction into buildings involves no more inconvenience or disfigurement than does that of an ordinary telegraph wire, being of about the same caliber. In order to convey a more exact idea of the apparatus, the following is translated from the prospectus of the Paris Company:

THE DIRECTING NORMAL CLOCK.

The Clock Proper.—It is through this clock that the working of all the others located in the street-piped district is effected. It is divided into two parts, working distinctly. First, a clockwork similar to all good pendulum and fly regulators; and secondly, a special movement for the opening and shutting of a balanced draw valve, the functions of which will be stated hereafter. These two distinct works are, however, connected in such a way that that of the draw-valve works only when the clockwork allows it; this special movement, which is produced by a clank motion, has for its purpose to send every minute through the street-piped district, and by the means of the draw valve, the necessary volume of air for the normal going of all clocks situated in the worked district.

Distributing Draw Valve.—This apparatus, ingeniously balanced in such a way that the pressure only acts on a very small portion of its surface, is inclosed in a valve box, fixed upon a glass provided with three apertures. The first of these apertures, always opened, keeps a constant communication between the valve-box and the distributing reservoir; it is, therefore, but an extension of this reservoir, and is, as the latter, always under constant pressure. The second aperture keeps in communication the valve-box with the street pipes, which open into the atmosphere through the third aperture. The draw-valve is never allowed to cover the first aperture, but covers the two latter ones when in its normal state. It follows that at the sixtieth second of each minute the clank work forces the draw-valve to open the second aperture, and therefore to send the pressure into the street pipes; at the end of a certain number of seconds, which is determined by experiment, and which varies between 10 and 15, according to the length of the pipes, the draw-valve is brought back to its former position, covers the two latter apertures, and sets free at its starting point all the pressure which has been sent into the pipes. This operation is thus renewed every minute.

Transmission of the Pressure by Hand.—The draw-valve apparatus is surmounted with three three-valve cocks, two of which connect with this apparatus at the outset and inset of the compressed air, and the third one keeps the two others connected. This device permits the use of the hand in the working of the directing clocks in case the normal and reserve clock should happen to need repairs—that is to say, that by opening and shutting the middle three-valve cock every minute the effect would be the same as that produced by the draw valve.

Winding of the Normal Clock.—The directing normal clock winds itself automatically, so as that the motive weights are brought up every minute by the same distance they went down for the working of the clock hands and of the clockwork. This winding up of the two movements of the clock is operated by means of the pressure, which is let out by the draw-valve every minute, and which pressure is transmitted into cylinders, whose pistons are thus lifted, transmitting their motion to the weights through a set of levers and gearwork. It follows that the Normal clock needs not to be touched, except for the oiling of the pivots.

RECEPTION CLOCKS.

The works of the reception clocks (minute indicating clocks) are constructed as simply as possible. Besides the ordinary minute wheels, they are furnished with a 60-teeth wheel, worked by a catch attached to a lever, which is put in motion by a leather bellows; a bar articulated with this lever rests upon this bellows. Another stopping catch prevents the wheel from turning backward when the motion has been produced. When at every minute the pressure is sent into the street-piped district, the bellows of every clock inflates, making the wheel advance by one tooth, and therefore the clock-hand by one minute. A stopping cleat, adjusted to the clock-work plate, prevents the the lever from pushing the wheel more than one tooth.

The compressed air, which takes but a few seconds to reach the end of the district through which all the pipes are located, causes thus all the hands of the clocks in that district to advance by one tooth, *i. e.*, one minute.

Control at the Central Office.—All the apparatus and manometers are provided with electric touches in such a way that all irregular working, all increase or decrease in the pressure would be at once signalled by an electric bell pointing out where the working is defective. Besides, one of the engineers of the company is kept on the watch day and night in the central office.

The rapidity with which the use of the pneumatic clock is extending in Paris indicates that it will become the generally accepted clock of that city. The privilege of using the clock costs a merely nominal sum for each dial, little or no more than the wear and tear of an ordinary clock; and where a number are required, as in the case of hotels, public buildings, &c., a reduction is made from the standard charge. And yet, so economical is the working of the system, that the company is realizing immense profits.

The system has also been established on a large scale in Vienna, where it appears to have proved as great a financial success as in Paris. A London banker recently bought the rights from the Paris company to use the patent in England, paying for it $250,000. The patent is also in process of introduction in Brussells, Rotterdam, Amsterdam and in cities in Italy and Spain; so that it bids fair to be generally adopted in the large cities of the world. We learn that New York is also to have an early opportunity of witnessing its application.

Iron Mills Closed.

PITTSBURGH, PA., June 1.—The iron mills of Western Pennsylvania are generally closed to-day. There are about 850 boiling furnaces, and the 150 in this immediate vicinity went out and the lockout began this morning. The agreement between masters and men expired June 1, and the failure of the former to concede to the advance demanded for puddling caused the shut down. The total number of laborers thus thrown out of employment, including miners, will not fall far short of 25,000. Only one mill in this city has signed the scale proposed by the Amalgamated Iron Association. Elsewhere in this district there have signed Brown, Bonnell & Co., of Youngstown, Ohio; Beaver Falls Rolling Mill Company, Beaver Falls: Bradley, Reis & Co., and the Shenango Iron Company, of Newcastle, Pa., and the United States Tin Plate Company, of McKeesport Pa.—*New York Herald.*

Railroad Accidents in England During 1879.—Although Americans are very frequently accused abroad of being reckless in running their railways, it appears that accidents to trains, permanent way, &c., are far more fatal to life and limb in England than in this country. In 1879 no less than 1032 persons were killed and 3513 were injured on the railways of Great Britain, while in this country, according to the records kept by the *Railroad Gazette*, 180 persons were killed and 644 were injured from May, 1879, to the close of April, 1880—a showing which is, it will be acknowledged, highly favorable to American railroad managers. It may be of interest to give the data concerning the accidents due to failures of rolling stock and permanent way. Of the failures in tires, 63 were engine tires, 37 tender tires, 11 carriage tires, 28 van tires, and 1088 were wagon tires, of which 888 were tires of wagons belonging to owners other than the railway companies. Of the 1227 tires which thus failed, 933 were made of iron and 262 of steel, while the material of 32 was not stated. Of the 496 axles which failed, 272 were engine axles, viz., 248 crank, or driving, and 24 leading, or trailing; 23 were tender axles, 3 carriage axles, 190 wagon axles and 8 axles of salt vans; 76 wagons belonged to owners other than the railway companies. Of the 248 crank, or driving, axles, 180 were made of iron and 68 of steel. The average mileage of 163 iron axles was 183,992 miles, and of 63 steel axles, 157,824 miles. Of the 1541 rails which broke, 1363 were double headed, 130 were single headed, 32 were of the bridge pattern and 15 were of Vignoles' section, while the section of one was not stated. Of the double-headed rails, 849 had been turned; 1225 rails were made of iron and 316 of steel.

At the meeting of the American Railway Master Mechanics' Association the conclusion was reached, after some discussion, that a wood fire, and not coal, should be used for annealing steel sheets after flanging.

Government Purchases of Four and a Half Per Cent. Bonds.—The Secretary of the Treasury has issued the following letter:

TREASURY DEPARTMENT, May 26, 1880.

General Thomas Hillhouse, Assistant Treasurer, New York.—SIR: I am not satisfied with the prices that the department has been compelled to pay for the bonds recently purchased, and am disposed to extend the call for bids to the fours and four and a halfs, which at market rates will pay the government a better interest. I have no fear but that Congress will provide means for the payment of the bonds as they mature, and am quite sure that the hope of the holders of bonds, that they will run longer than maturity, is unfounded. You will, therefore, please give notice that next Wednesday, and every Wednesday thereafter until further notice, the department will receive bids for the 4 and 4½ per cent. bonds of the United States, as well as for those of the description heretofore purchased.

Very respectfully,
JOHN SHERMAN, Secretary.

Exports and Imports.—The Chief of the Bureau of Statistics, in his tenth monthly statement for the current fiscal year of the imports and exports of the United States, states that the excess of imports or of exports of merchandise stated in special values was as follows: Month ended April 20, 1880 (excess of imports), $3,850,648; month ended April 30, 1879 (excess of exports), $12,205,761; 10 months ended April 30, 1880 (excess of exports), $155,241,872; 10 months ended April 30, 1879 (excess of exports), $241,477,822; 12 months ended April 30, 1880 (excess of exports), $178,425,716; 12 months ended April 30, 1879 (excess of exports), $272,269,969. The excess of imports or of exports of gold and silver coin and bullion was as follows: Month ended April 30, 1880 (excess of imports), $725,643; month ended April 30, 1879 (excess of imports), $2,452,655; 10 months ended April 30, 1880 (excess of imports), $76,296,825; 10 months ended April 30, 1879 (excess of exports), $2,356,560; 12 months ended April 30, 1880 (excess of imports), $73,951,944; 12 months ended April 30, 1879 (excess of exports) $5,270,647.

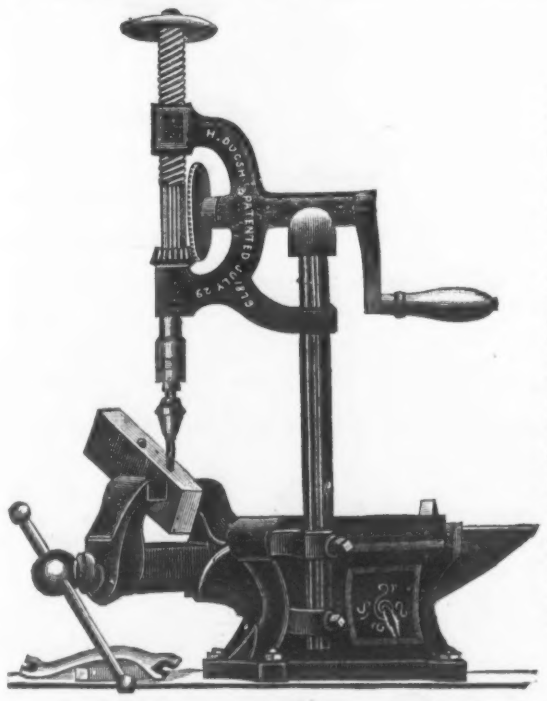
The St. Gothard Tunnel.—A Geneva dispatch says: "A difficulty has supervened in the construction of the St. Gothard Tunnel which threatens seriously to retard its completion. In the part of it where the formation is of porous white stone, the vaulting has already given way two or three times, and it has required the greatest care and constant staying with timber to prevent the passage there from completely collapsing. It was thought, however, that a granite wall 6 feet thick would support the superincumbent mass of white stone and keep the tunnel permanently open. A wall of this thickness has just been finished, but it has begun to give way, and the engineers are at their wits' end how to overcome the difficulty. In the opinion of the geologist of the tunnel, it can be overcome only by making a wide curve, so as to get round the white stone instead of going through it. This would involve the entire reconstruction of that part of the tunnel, in which case, probably, it will not be ready for traffic before the time fixed for the completion of the lines of approach, two years hence.

A small screw steamer called the Anthracite left the Thames for Falmouth on the 29th ult., *en route* to America. She is the smallest steamer that has ever undertaken this voyage on her own unaided resources. The voyage is for the purpose of testing the Perkins system of tubular boilers, which are charged with fresh distilled water, a small quantity only being required, and this after being condensed into steam and used in the engine is condensed and reused. The preliminary run was made on Wednesday. Many scientific and prominent gentlemen were on board. The trip was from Erith to Chapman Light and back, a distance of 46 miles. The steam pressure throughout was maintained at an average of 350 pounds to the square inch, half throttled revolutions 132 per minute. The engines worked most satisfactorily. With the tide adverse both ways the speed averaged eight knots an hour. The trip promised well for the result of the Atlantic voyage. If successful, the experiment will inaugurate a new era in marine engineering in regard to economy of fuel. She is furnished with Perkins boilers, engines of high pressure and compound surface and also condensing engines. Her gross tonnage is 69.30, her registered tonnage 27.09. Her length is 84 feet, her beam 16 1-10 and her depth 10 1-10.

An insulated wire was excavated at High Bridge, Harlem River, on Tuesday by some workmen. It was several feet below the surface and has been the subject of much conjecture and a number of theories. The facts in the case are these: In 1849 when the Bain telegraph line from this city to Boston was building, the authorities refused to allow the wire to be fastened to the Harlem Bridge, on the ground that it might attract the lightning and be the cause of an accident to the bridge. In that emergency Charles T. Smith, who was building the line and who is now connected with the Western Union Telegraph Company in New York, laid in the Harlem River the cable a part of which has just been discovered.

The Cleveland ironmaster's Statistics for April show a net decrease in stock of 13,623 tons, the total quantity held being 243,855 tons. Makers' stocks increased 12,948 tons, but this was counterbalanced by a decrease of 21,071 tons in the public warrant stores, and of 5494 tons in makers' private stores. The output of iron was 201,619 tons, or 3246 tons less than in March. Of this 162,226 tons were made from Cleveland ores. There are now 89 furnaces making Cleveland iron, and 22 making other kinds of pig iron. The exports of pig iron amounted to 88,018 tons, or 22,700 tons more than in April, 1879. Of this 61,414 tons were sent abroad—22,510 tons more than in 1879.

ANVIL, VISE AND DRILL.



This machine was first made by a practical mechanic for his own use, and to meet a want which nothing in the market would fill. It was so highly regarded by all who saw it that he was minded to get it patented and manufactured for the market. When it was brought to our attention we saw at once its great utility, and bought the exclusive right for the whole United States. We believe it will come into general use as fast as its merits become known. The anvil face is 4x8 inches, and hight 6 inches. Width of vise jaw, 3½ inches; steel drill press, with adjustable chuck to hold ¼-inch drills, and all smaller sizes. The article to be drilled can be held firmly in the vise, so as to be drilled at any angle, or if it is too large for the vise it can be drilled on the anvil. The drill may be removed when not in use. Price for the whole, $18. Weight, 80 pounds. The vise and anvil are complete without the drill, and are sold for $10; weight, 60 pounds. For all jobbing shops, it is worth much more than it costs. Farmers can do with it many jobs which otherwise would have to be sent to the shops. All Hardware dealers who do not keep them in stock will furnish them on demand, or we will send them on receipt of the price.

MILLERS FALLS CO.,

74 CHAMBERS ST., NEW YORK.

HEATON & DENCKLA,

Hardware Commission Merchants,

507 Commerce Street, Philadelphia.

E. & G. BROOKE'S "Anchor Brand" Nails, Brads, Spikes, &c.
MALLORY, WHEELER & CO.'S Door and Pad Locks.
UNION MANUFACTURING CO.'S Butts.
AMERICAN SCREW CO.'S Screws.
D. R. BARTON TOOL CO.'S Edge Tools, &c.
FRANCE'S Shutter Holders.
Anti-Window Rattlers, Brass and Nickel-Plated.
WESTERN FILE CO.'S Cast-Steel Files.
AMERICAN SHEAR CO.'S Shears and Scissors.
H. M. MYERS & CO.'S Shovels, Spades and Scoops.
STEELE & SONS' Wrought Handle Sad Irons.
EXCELSIOR MILLS, Genuine Turkish Emery.
BROWN & BRO.'S Brass and Copper Wire, Rivets, Spoons, &c.
GAYLORD MANUFACTURING CO.'S Till, Chest and Cupboard Locks.
AMES' Genuine (A) Chester Emery.
COLWELL & COLLINS, NORWAY BOLT CO., Norway Carriage and Tire Bolts.
PLYMOUTH MILL CO.'S Black and Tinned Iron Rivets.
AMERICAN MACHINE CO.'S Fluters, &c.
STUART, PETERSON & CO.'S Tinned and Enameled Ware, &c.
HUSSEY, HOWE & CO.'S Bar & Sheet Cast Steel.

Also a large line of Heavy and Shelf Hardware.

F. HABERMAN,

MANUFACTURER OF

Stamped, Japanned and Plain

TINWARE,

AND THE CHEAPEST AND BEST

OIL AND GAS STOVES

IN THE MARKET.

NOTE.—These Stoves are made under license from the Kerosene Lamp Heater Co., the royalties are paid by me, and the Stoves have license tags attached, so that dealers may purchase and sell them with perfect safety.

SEND FOR CIRCULARS.

294 PEARL STREET, NEW YORK.

DAVID HYMES & Co.,
92 Church St., New York.
HEDGES HARDWARE CO.
HART & CO.
CLEMSON & CO.
KING & BLEIER.

PADLOCKS,

MONOGRAM, TERROR, ARGUS AND PINAFORE.

The Cheapest line of goods in the market.

Sample orders solicited.

H. S. MANNING & CO.,

Sole Sales Agents for **THE MORSE TWIST DRILL AND MACHINE CO.'S**

Manufacture of Patent Machine Relieved Nut, Hand, Blacksmith and Machine Screw Taps, Screw Plates, Tap Wrenches and Patent Relieved Pipe Taps and Pipe Reamers, also of Solid Bolt and Pipe Dies. Furnished in V, U. S. Standard and Whitworth shape of threads.

111 Liberty Street, NEW YORK.

No. 1.

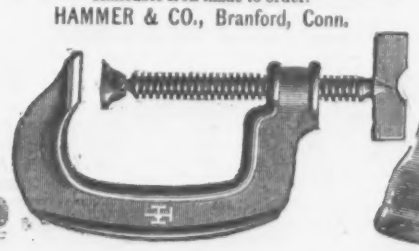
NEW sizes Patent Malleable Iron Oilers, Nos. 2 and 3.
NEW pattern Heavy Screw Clamps; strongest in the market.

Send for Price List.

Malleable Iron Castings

Of superior quality, and Hardware Specialties in Malleable Iron made to order.

HAMMER & CO., Branford, Conn.



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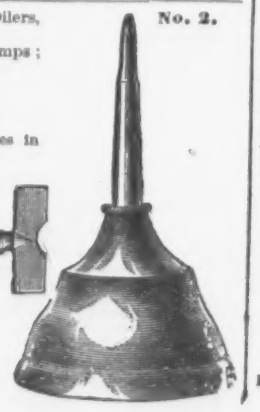
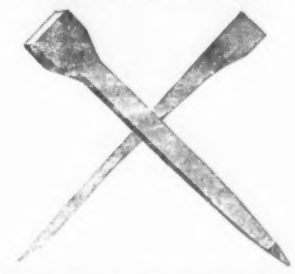


NATIONAL Horse Nail Co.

MANUFACTURERS OF

FINISHED

[BRIGHT OR BLUED]



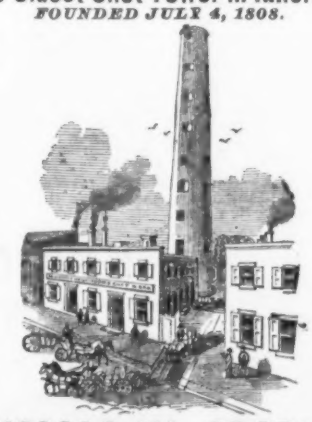
These nails are made of the best brands of **NORWAY IRON,** and are guaranteed to be equal to any in the market.

NATIONAL HORSE NAIL CO.,
VERGENNES, VT.

DURRIE & McCARTY, Agents,
No. 97 Chambers St., New York

The Oldest Shot Tower in America.

FOUNDED JULY 4, 1808.



THOMAS W. SPARKS,

Manufactnrer of

SPARKS'

American Chilled Shot,

Rivaling the English and all Others.

STANDARD DROP & BUCK SHOT AND BAR LEAD.

121 Walnut Street, Philadelphia.

The President LAWN MOWER.

The most beautiful and perfect Mower ever offered. A complete assortment of **Ten Sizes.** Hand machines, $10 and upward. **New Pony Mower, $55.** Horse Mowers, $80 and $100. Acknowledged at home and abroad the Lawn Mower *par excellence. Easily operated,* **noiseless** and incomparably the most durable. Compare the President with all others and **Buy the Best.**

CARR & HOBSON, 47 Cliff St., } *Two doors from Fulton.*
PAGE, FARGO & CO., 325 Broadway.

Acid Nickel Plating Solution.

C. G. PENDLETON

Is now prepared to fill all orders of 50 gallons and upward for his Nickel Plating Solution, the use of which the U. S. C. Court of N. Y. has decided to be no contempt of the United Nickel Co. injunctions. See *The Iron Age*, April 22 and 29, 1880, and *The Metal Worker*, April 24 and May 1, 1880.

All orders must be addressed to

C. C. PENDLETON,
176 and 178 Centre Street, New York.

Refer to Frost & Coe, Attorneys, 233 B'way, N. Y.

RIEHLÉ BROS.

STANDARD

SCALES

AND

TESTING MACHINES

Patent "Self-Adjusting" Railroad Track Scales, pronounced "the most accurate and durable" over all competitors at World's Fair, 1876. In use by Pennsylvania, Lehigh Valley, Baltimore and Ohio, and other Railroads. Patent Coal and Hay Scales. Warehouse and Platform Scales and Scales for all purposes. Machines for testing materials, all sizes.
Works, 9th st., at Master; Store, 52 S. 4th st., Phila
New York Office 91 Liberty Street.

sold by the hardware trad.

"DRAW CUT"
BUTCHERS' MACHINES.
Choppers, Hand and Power
Stuffers,
Lard Presses.
Warranted thoroughly made and the BEST IN USE.
MURRAY IRON WORKS,
Burlington, Iowa.

R. C. PURVIS,
Manufacturer of
Octagon Tea Pots.

Rear of 407 Cherry St., Philadelphia, Pa.
Send for Price List.

Established in 1839. Formerly L. & A. G. Coes.

L. COES & CO.

Manufacturers of L. Coes'

GENUINE IMPROVED  AND MECHANICS

Wide Bar Full Length. Wide Bar Full Length.

Patent Screw Wrenches

UNDER PATENTS DATED

JUNE 26, 1866,
MARCH 23, 1869,
REISSUED 1870.

NOVEMBER 10, 1863,
FEBRUARY 23, 1864,
REISSUED JUNE 1, 1869,
IMPROVED AUG. 1, 1877.

The back thrust when in use borne by the SHANK instead of the Handle

None genuine unless stamped "L. COES & CO."

WORCESTER, MASS.

Warehouse, 97 Chambers St., & 81 Reade St., N. Y.

DURRIE & McCARTY, Sole Agents.

The 1880 Pennsylvania Lawn Mower.

OUTSTRIPS ALL COMPETITORS. PREMIUMS TAKEN OVER ALL OTHER MOWERS.

EVERY MACHINE WARRANTED TO WORK AS REPRESENTED.

Points Claimed as being Meritorious:

The lightest; runs more easily; cuts longer grass; requires less repairs; is more durable; cuts more smoothly; don't require sharpening once where others do half a dozen times.

PRICE LIST.

Width of Cutter.	Style. Driving Wheels.	Power required.	Weight.	Price.
10 inch.	8 inch.	A Child.	30½ lbs.	$14.00
12 "	8 "	A Lad.	33½ "	18.00
14 "	8 "	A Lady.	36 "	20.00
16 "	8 "	One Man Size.	38 "	22.00
18 "	8 "	" "	41 "	24.00

NEW MACHINES

For Cutting Long Grass

15 inch, 10½ inch Driving Wheels, 6½ inch Cylinder, Man Size, 48 lbs..... $23.00
17 inch, 10½ inch Driving Wheels, 6½ inch Cylinder, Man Size, 51 lbs. 25.00

QUAKER CITY 10-INCH LAWN MOWER, - - List $12.00

The QUAKER CITY guaranteed the best Mower for price manufactured.
Discount to the trade.

For Sale By

LLOYD, SUPPLEE & WALTON, Philadelphia.
DURRIE & McCARTY, New York.
AMES PLOW CO., Boston, Mass.
PRATT & CO., Buffalo, N. Y.
SIMMONS HARDWARE CO., St. Louis, Mo.
HAMILTON & MATHEWS, Rochester, N. Y.
MARKLY, ALLING & CO., Chicago, Ill.
DUCHARME, FLETCHER & CO., Detroit, Mich
LOCKWOOD, VANDOORN & TAYLOR, Cleveland.
KRUSE & BAHLMAN, Cincinnati, O.
PRATT & CO., Elmira, N. Y.
LLOYD & CLARKE, La Crosse, Wis.
SMITH & SCRIBNER, Minneapolis, Minn
HART & CO., Louisville, Ky.

THE NEW

"CHARTER OAK" LAWN MOWER.

Russell & Erwin Mfg. Co., Agents, NEW YORK.

The most beautiful and perfect Lawn Mower in the world. It stands to-day at the head of the list of Lawn Mowers in the United States and Europe. It is mounted on two large driving wheels or pulleys, and instead of being on the outside of the frames, to run in the uncut grass, they are placed *inside the frames*, back of the cutting-blades, running on a shaft, each independent of the other, allowing the machine to be turned either to the right or the left without injury to the sod, and to be turned around in a circle no greater than its own length, and cutting at the same time. Those desiring a perfect Lawn Mower will find the "CHARTER OAK" far superior to any other. It is more durable, easier to adjust, operate and keep in order, and the driving wheels being inside the frames, enables the operator to cut the grass clean around walks, drives flower-beds, trees and shrubbery.

Manufactured in Five Sizes.
8-inch, 10-inch, 13-inch, 15-inch (standard) 18-inch.

Ajax, Jr.,

AND

Hebe LAWN MOWERS,

Manufactured by

L. WILDER,
Hoosick Falls, N. Y.

These Machines stand unrivaled, having many points of novelty which are superior to all other Lawn Mowers. The cutting is done by a series of spiral knives operating against the ledger blade. They are so constructed that they will allow the tall grass to pass in between them and approach the ledger blade, as the machine moves forward, while the wipers reach around the grass and bring it against the knife, which cuts it off, thereby preventing the machine from clogging and cutting the grass more than once.

POINTS OF SUPERIORITY.

They will cut grass of any hight.
They run the easiest.
They are the easiest to sharpen.
They have the latest improved noiseless ratchet.
They will cut the grass the smoothest.
Every part, where found necessary, is made of malleable iron and steel.
Width of cut, 13 inches.
Every part is interchangeable.

FOR SALE BY

LEONARD & McCOY, 118 Liberty Street, New York.
DURFUR & CO., Baltimore, Md.
WM. L. BOYER & BRO. Philadelphia, Pa.
J. H. & W. E. CONE, Hartford, Conn.
E. H. VALENTINE, Chicago, Ill.
W. J. KINSEY, Denver, Col.
FRANK BROS., San Francisco, Cal.
WOOD, SHAND & CO., Christ Church, New Zealand

Decorated Tin Plates and Tin Goods.

The art of applying colors and designs to tin plate and to tin goods has been brought to a high state of perfection in England, both in point of decoration and in respect of workmanship. The accompanying engravings represent designs recently brought out by the Tin Plate Decorating Company, of Neath, South Wales. This company, it is said, make a specialty of small boxes, used for such purposes as the packing of small nails and tacks, tooth powders, cosmetics, &c., all of which are handsomely decorated. A class of designs upon which special stress is put at the present time are termed fern patterns, an example of which is shown in Fig. 1. One of their applications is to waiters or trays, which are made either circular or oval in shape. The patterns are laid on of different colors and enlivened by the process of crystallization, which adds much to the general appearance.

Decorated tea trays and japanned boxes form one of the staple lines of English industry. When it had its origin it is hard to say, but it can be traced in various forms

Decorated Tin Plate.—Fig. 1.—Fern Design for Waiter.

for more than a hundred years. The records show that the manufacture of tin plates was well established in Germany at least as early as 1600. Germany has the honor of inventing the tin-coated iron plate now known as tin plate. At the date we have named these plates were extensively imported into England, where they were largely used in manufacturing. How early the art of varnishing and decorating them was introduced we do not know. Probably in the early days of the trade only the cheapest wares were made, and the japanned goods were of a class only suitable for the cheapest markets. One of the earliest manufacturers who turned out any good work was John Baskerville, who was afterward the famous printer. He began life as a writing master, and having not only great business ability, but excellent taste, took up the business of japanning with great success. He introduced immense improvements into the designs used and greatly elevated the art department of the work. Until the time of the World's Fair in 1851 there was, however, great need for improvement, and it would almost seem that the character of the work had gone backward instead of advancing during the previous hundred years. With the revival of art and artistic taste came a great change in the character of English japanned work, especially that which received hand decoration. Many of the first English artists began their careers as painters upon tinware for the japanners. The result of this is that not only are these goods excellent in wearing quality, but they can be obtained most beautifully decorated.

Within a few years the English trade papers, and especially the *Ironmonger*, have recorded great progress in the decoration of the commonest kinds of goods. The accompanying illustrations show some of the goods. The design shown in Fig. 1 is very

Decorated Tin Plate.—Fig. 2.—Oval Design for Waiter.

neat, and if properly treated, would be very beautiful and worthy of a better place than the surface of a tea tray. The oval design for a waiter shown in Fig. 2 would, if colored, as many of these goods are, be equally beautiful and very appropriate for the purpose to which it is put. Fig. 3 shows a design for a circular waiter, somewhat Moorish in its suggestion, which is very rich. Simple designs like these are not the only ones which are given to goods of this class. "Hand-painted" landscapes and figure pieces are common, and when the artist is an expert, as is very commonly the case, the results are very beautiful. In hand decoration the English excel. Their art schools and the excellent training which their scholars receive, and the great numbers which are turned out each year, enable the manufacturer to secure skilled artistic hands capable of carrying out the designs of the artist in a satisfactory manner. Such work brings high prices, and there is ample margin not only for the manufacturers, but for the artist as well.

The English hand-painted tiles are good examples of what can be done in this direction. The design is printed in outline, with now and then a little shading added. The tiles thus printed are then handed over to the artist, who then adds color and such fine touches as are needed to transform the tile into a work of art instead of a simple print. The work thus turned out costs in actual manual labor only a small fraction more than the commonest coat of clay tile; yet the prices obtained are something astonishing to an American who is not accustomed to work of this class, and who only looks at the quantity of labor expended, and not upon its quality.

Something of the same principles are applied in the decoration of the highest grades of japanned tinware. The artist has an opportunity to expend his labor to the best advantage. His work will last. A painting upon tin, if carefully done and well finished and baked, is one of the most durable things that can well be imagined far surpassing, in that respect, oil paintings upon canvas.

It appears strange that some of the large works which are engaged in marbleizing slate do not apply the same process to the decoration of sheet iron. Many of these establishments are accustomed to putting highly-finished oil paintings upon stone, and protecting them by their usual finishing processes of varnishing and baking. The results obtained in this way are very beautiful, and there is no difficulty in treating iron in the same way. Probably the tin itself on tin plate would hardly endure the very high heat of the baking furnaces.

The English trays vary in thickness between Nos. 24 and 29 American wire gauge. In size they are made from 12 to 30 inches, and "waiters," as they are called, from 6 to 20 inches. The prices for the latter vary from 25 or 30 cents a dozen upward. Trays usually range from $2.25 upward. The cheaper kinds have an extensive sale in South America, Spain, Russia and Norway. Decorations are carefully suited to the tastes of the countries where the goods are sent. This is a point of no little importance, since the patterns that would command the market in Russia would be utterly unsalable in the north of Europe. Within a few years a very considerable trade has been opened with Japan, and decorated "japanned" trays, and the like, are sent in considerable quantities to Japan itself. This may seem like sending coals to Newcastle, but in this case the cheapness of the goods sells them—the real Japanese work being exported. In this trade Japanese designs are closely followed, it is said, and the English imitations are praised by the natives.

The production of these goods is almost beyond estimation. We have no recent statistics at hand, but from the rate of increase in the years for which we have fig-

Decorated Tin Plate.—Fig. 3.—Design for Waiter.

ures, we judge that the trade must double itself within a comparatively short time.

Although decorating is carried on to a considerable extent in this country, and grocers' canisters, coal hods, coolers and similar articles are covered with transfer ornament, we do not call to mind any lines of fine stamped goods which are decorated in a really first-class manner. Possibly this is because higher-priced goods of a different character take their place, and there is, consequently, no inquiry for them. It seems certain, however, that if our stamping companies took up this branch of work a new and extensive trade might be built up which would yield very large profits.

An Overworked People.

Among other things said by William Walter Phelps, at a meeting of physicians and surgeons not long since, the following will bear reading more than once:

We are a nation without contentment without rest, without happiness. In a feverish race we pass from the cradle to the grave—successful men, to whom life is a failure. Our boys leave the university when English boys leave their school. Our merchants leave their trade, retiring to some more dignified or honorable work, as they believe it, at an age when the German merchant first feels the master of his trade. We are always anticipating the future, forcing the task of a whole life into part. Worse, we are not content with doing a year's work in a month in our calling, but we must do enough in all other callings to win distinction there. In other lands it is enough to be a lawyer, physician, clergyman, merchant. Here we are nobodies unless we fill the spere of all human occupations. One must be a statesman and know political science as if already in office. He must be an orator, and ready to persuade and instruct, a wit to shine at the dinner table, a literateur, a critic! There is too much human nature in man for this to mean anything except a discontented life and a premature death. And the remedy? Correct public opinion. We must honor the man who faithfully does his task, whatever it is. Not the task, but the faithfulness with which it is done, must be the measure of the honor. The men will be content with their father's trade. This will give us that family association which is a sure pledge of good conduct and patriotic love. This will give us, too, that traditional aptitude which alone gives great mechanical excellence. It will not be a bad time for American manufactures when we find stamped on them what Mr. Griffs finds on Japanese bronzes. 'Done by the ninth bronzer in this family.' Then men will keep occupation of their youth for their age, and, having leisure, will build the foundations broad enough to withstand bankruptcy. Then men will seek excellence in their callings. Then men will alternate labor with rest and obey the demand of nature.

SEYMOUR'S SHEARS AND SCISSORS.

HENRY SEYMOUR CUTLERY CO.,

MANUFACTURERS OF

Full Nickel Plated and Maroon Japan Handle

Shears & Scissors

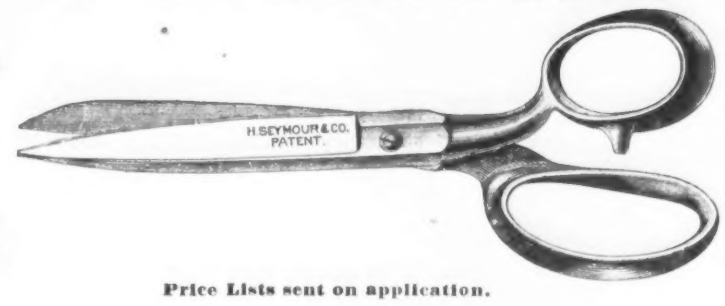
EVERY PAIR WARRANTED.

Sold by Hardware dealers throughout the country.

Salesrooms,

84 and 86 Chambers Street, New York City.

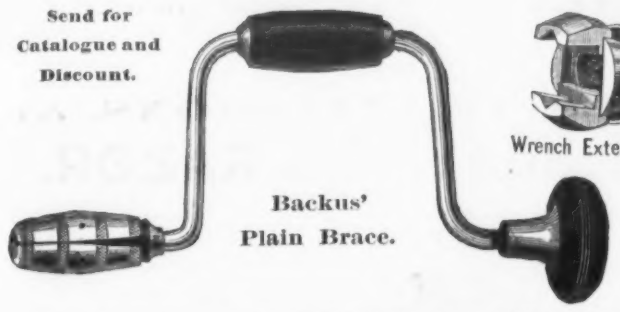
Manufactory, HOLYOKE, MASS.



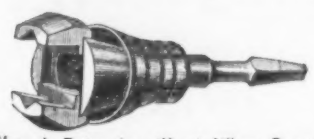
Price Lists sent on application.

Q. S. BACKUS' New Improved Bit Braces, Ratchet Braces, Bit Brace Wrenches, Angular Borers, &c.

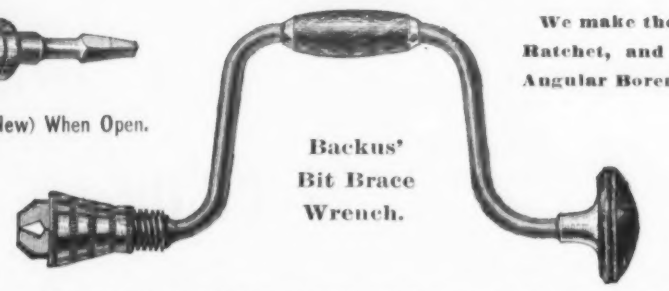
Send for Catalogue and Discount.



Backus' Plain Brace.



Wrench Extension (New) When Open.



Backus' Bit Brace Wrench.

We make the Brace Wrench with Ratchet, and also apply it to our Angular Borer.

All Bit Brace Wrenches are Nickel-Plated.

Backus' New Ratchet Brace.

Having done away with the objectionable *Inner Jaws*, which we found could not be applied with entire satisfaction to all kinds of Bits, we take pleasure in presenting to the mechanic a Brace which, by its adjustability to *every style and size of Bit*, makes it absolutely perfect, and we think the best Brace ever offered in the market.

***No mechanic should be without this tool*, combining as it does all the advantages of the regular Bit Brace, holding firmly Bits of all sizes, from the smallest to the largest, while at the same time it is a perfect Socket Wrench, with which Nuts and Bolts from ¼ to 1¼ inches can be turned with great rapidity, and to a great extent doing away with the need of the old-fashioned screw wrench.**

Having done away with the objectionable two pawls worked by a lever, which was often found to be in the way, we now offer a ratchet which we feel cannot possibly be improved; using but one pawl worked by a simple ring, by turning which from one to the other of the three small notches, you set the ratchet so as to work either to the right, left, or stand rigid.

Some of my friends and customers having made inquiries with regard to certain published threats, referring to a patent decision on my old and discarded styles, I take pleasure in announcing that they need have no apprehension from that source whatever.

Q. S. BACKUS, 102 Chambers Street, New York.

NEW YORK STATE AGRICULTURAL WORKS, Established 1830.

LA DORR'S

Jointed Pulverizing Harrow.

Eagle Rake.

WHEELER & MELICK COMPANY,

Patentees and Manufacturers of

Railway & Lever Horse Powers, Wheeler's Vibratory Threshers & Cleaners.

Ellis's One and Two-Horse Threshers and Cleaners, Threshers and Shakers, Straw-Preserving Rye Threshers, Eagle Hand and Horse Dumping Rake; La Dorr's Jointed Pulverizing Disc Harrow, the only Disc Harrow that will thoroughly pulverize the ground, leave it smooth and cover the seed; Tolley's Champion One and Two-Horse Cultivator with patent screw teeth Steam Engines, Dog and Pony Powers, Wood Sawing Machines, Shingle Machines; La Dorr's Disc Corn Cultivator, unequalled by anything for cultivating corn or any rowed crop. All machines made of first-class material, and are the best machines for export and home trade. Having been established nearly fifty years, our reputation is second to none.

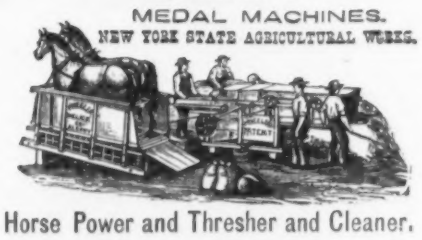
Send for illustrated circular and report of Centennial Trial.

WHEELER & MELICK COMPANY,

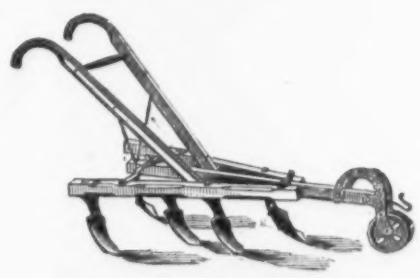
Albany, N. Y., U. S. A.

WHEELER'S MEDAL MACHINES.

NEW YORK STATE AGRICULTURAL WORKS.



Horse Power and Thresher and Cleaner.



Tolley's Champion Cultivator.

COBB AND DREW'S TACK AND RIVET WORKS,

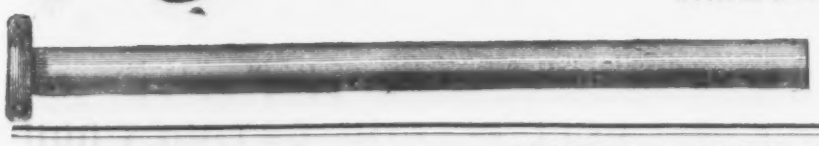
PLYMOUTH, MASS.,

MANUFACTURERS OF

TACKS AND SMALL NAILS, COPPER BELT RIVETS AND BURRS,

Tinned Iron and Coppered Iron Belt Rivets and Burrs. Rivets, Burrs, Tacks or Nails Made to Sample.

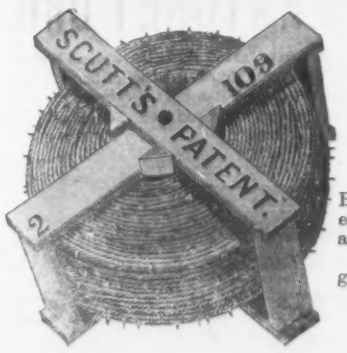
Section and Hame Rivets in bulk or one-pound Boxes.

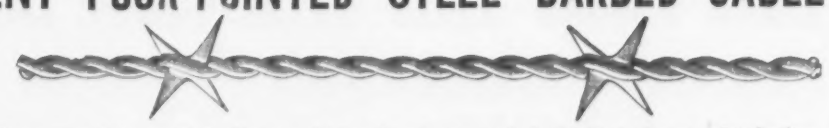


GEO. C. GRUNDY, Agent,

165 Greenwich St., N. Y.

SCUTT'S PATENT FOUR-POINTED STEEL BARBED CABLE FENCE WIRE.



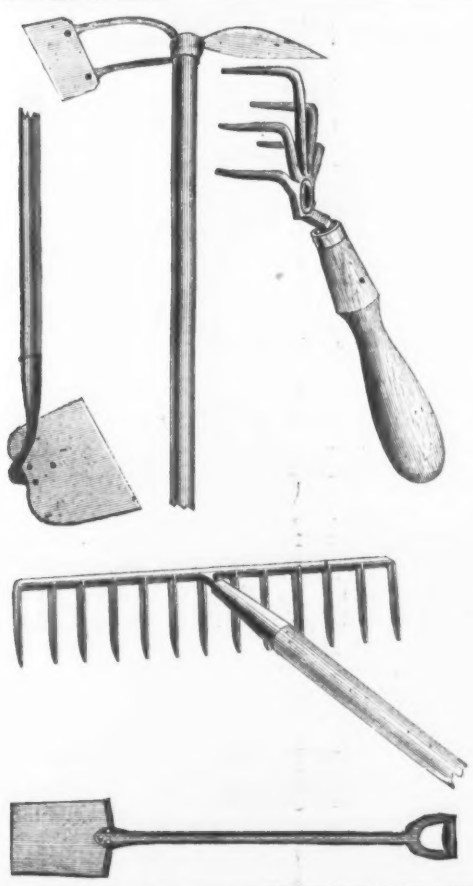


The cable is formed in the same manner as the great cables used in bridges, and has a tensile strength double that of any twisted wire. It is the only barbed wire so manufactured. Both wire and barb material are manufactured especially for our use from the finest grade of Siemens-Martin steel. Our wire offers double the protection afforded by any two-pointed barb, each rod giving 128 points, while two-pointed barbs give but 64. It is the most attractive in appearance, and the best selling wire in the market, and, by actual tests, the strongest, lightest and consequently the cheapest.

We manufacture under license from the Washburn & Moen Mfg. Co., and all danger of law suits is avoided in the purchase of our goods. We manufacture both painted and galvanized. The only Solid Steel Four-pointed Barb. Send for circulars and price list.

H. B. SCUTT & CO., Buffalo, N. Y.

Represented in New York by GEO. L. SQUIER & BRO., 195 Water Street.



C. W. Dunlap & Co.,

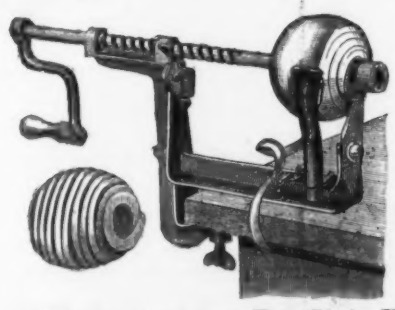
43 CHAMBERS ST., NEW YORK.

MANUFACTURERS OF ALL KINDS OF

GARDEN TOOLS

Catalogues furnished on application.

The Family Paring, Coring & Slicing Machine



As the result of many years' experience in making Paring Machines of all kinds, we introduce to our friends our new Family Parer, Corer and Slicer, well satisfied it will win its way in favor with all who use it.

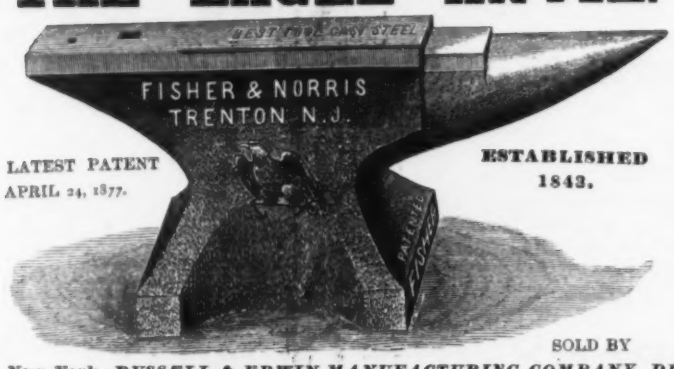
Each and every advantage enjoyed by using any of the different contrivances for preparing apples, for future as well as present use, is obtained in this one simple but most useful machine. It pares an apple so quickly, takes out the core with so little waste, and slices it to suit every use, and all so complete and thorough as to meet every want. The coring and slicing attachment is adjustable, and can be used or not as required, while the machine all complete is furnished at same price as machines used simply for paring purposes only. **Price, $7.50 per doz.**

We also manufacture **Bay State Paring, Coring and Slicing Machines,** three sizes, the larger sizes having been used for years by large fruit-drying establishments everywhere.

GOODELL COMPANY, Antrim, N. H.,

SOLE MANUFACTURERS.

THE "EAGLE" ANVIL.



LATEST PATENT APRIL 24, 1877.

ESTABLISHED 1843.

SOLD BY

New York—RUSSELL & ERWIN MANUFACTURING COMPANY. DURRIE & McCARTY, TENNIS & WILSON.
Philadelphia—JAMES C. HAND & CO. Boston—GEORGE H GRAY & DANFORTH.
Baltimore—W. H. COLE & SONS, JOHN B. KELSO, Jr.
Louisville—W. B. BELKNAP & CO. Cincinnati—POST & CO. Cleveland—THE LAKE ERIE IRON CO.

WARRANTED!!

Better than the Best English Anvil.

Face in one piece, of BEST TOOL CAST STEEL. PERFECTLY WELDED, perfectly true; of hardest temper and never to come off or "settle." It does not bounce the hammer back, and therefore can do more work with lighter hammer. Horn of tough *untempered steel*, never to break or bend. *Only Anvil made in United States fully warranted as above. None genuine without our trade-mark.*

PRICE LIST, APRIL 1, 1880.

ANVILS weighing 100 lbs. to 800 lbs.....10 cents per lb

SMALLER ANVILS ("MINIMS.")

	No. 000	00	0	1	2	3
Weighing about	½	4	10	15	30	50 lbs.
	$1.25	2.00	2.75	3.25	4.00	4.50
	No. 4	5	6	7	8	9
Weighing about	40	50	60	70	80	90 lbs.
	$5.25	6.00	6.50	7.25	8.00	9.00

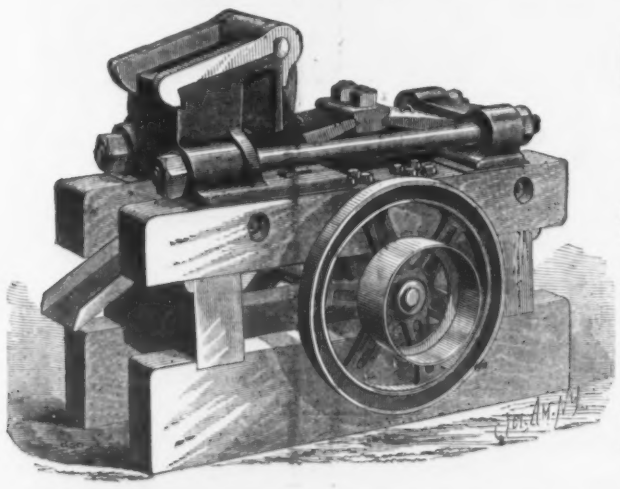
N. B.—These are the RETAIL PRICES. The only additional cost will be the freight to the purchaser's place of residence.

The No. 000 is silver-plated, and is mailed postpaid to any part of the United States on receipt of the price.

EAGLE STAKES.

	No. 1	2	3	4	5	6	7
Size of face, square	2	3	4	4½	5	5½	6 inches.
	$1.75	2.50	3.75	4.50	5.50	6.50	7.75

Important to Railway Companies, Cities and Mine Owners.



BLAKE'S CHALLENGE ROCK BREAKER

OR

Sectional Cushioned Crusher,

Patented Nov. 18, 1879.

Will be found the most economical and reliable crusher ever offered to the public for crushing

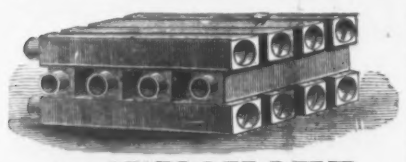
RAILWAY BALLAST, ROAD METAL,
STONE FOR CONCRETE, QUARTZ,
FLINT, EMERY, CORUNDUM,
FELDSPAR, BARYTA,
MANGANESE, PLASTER,
SOAPSTONE, &c., &c.

This machine dispenses with cast iron frame and pitman of our old forms. All strains are on wrought iron or steel.

Over 50 Medals, including Paris Gold and Silver Medals.

ADDRESS

BLAKE CRUSHER CO., Sole Makers,
New Haven, Conn.



A. WYCKOFF,

Manufacturer of

Wyckoff Patent Wood Water Pipe,

Steam Pipe Casing,

Chain Pump Tube, Curbs, Reels, Rubber Valves, Chain, &c.

Established 1845. Send for pamphlet.

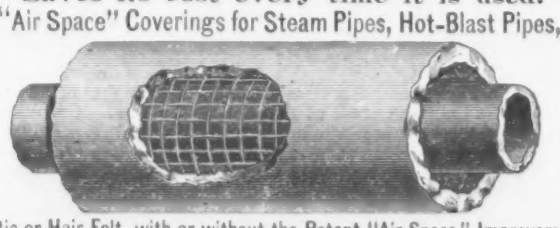
ELMIRA, N. Y.

ASBESTOS MATERIALS, FIBER, MILLBOARD, PACKING & CEMENT.

THE NATIONAL STEEL TUBE CLEANER.

Saves its cost every time it is used.

The Patent "Air Space" Coverings for Steam Pipes, Hot-Blast Pipes, Boilers, &c.



Plastic or Hair Felt, with or without the Patent "Air Space" Improvement.

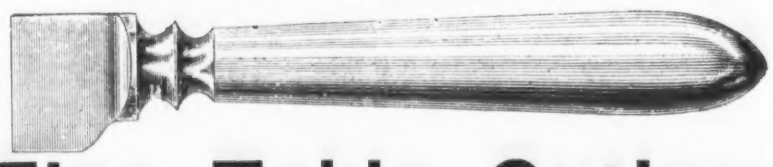
THE CHALMERS-SPENCE CO., foot 9th St., E. R., New York.

GREENFIELD TOOL CO.

(GREENFIELD CUTLERY CO.)

Greenfield, Mass., U. S. A.,

MANUFACTURERS OF



Fine Table Cutlery.

Solid Handled, Bone, Ivory, Rubber and Wood, Solid Steel Silver Plated.

PATENT CONCAVE FORGED OX SHOES.

Also, FLAT SHOES with TWO CALKS at same price.

ALSO,

PLANES, PLANE IRONS, &c.

THE SLAYTON RAZOR.

This cut is exact size of Razor.

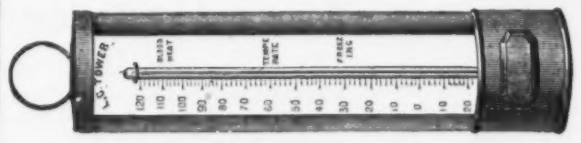
PERFECTION

FOR PORTABILITY.
FOR CUTTING QUALITY.
FOR TEMPER.

Handles of German Silver, Nickel Plated. Blades of the Finest Steel in the World. Every Razor Fully Warranted.

L. C. TOWER, Thermometer Manufacturer,

Canvassers Wanted. **39 Exchange St., Rochester, N. Y., Sole Agent.**



L. C. TOWER

Manufacturer of

Thermometers

Of Every Description,

Rochester, N. Y.

LIGHTNING HAY KNIVES,

WEYMOUTH'S PATENT.

This knife is the best in use for cutting down hay and straw in mow and stack, cutting fine feed from bale, cutting corn stalks for feed, cutting peat and ditching marshes.

The blade is best cast steel, spring temper, easily sharpened, and is giving *universal* satisfaction. A few moments' trial will show its merits, and parties once using it are unwilling to do without it. Its sales are fast increasing for exports as well as home trade, and it *seems destined* to take the place of all other Hay Knives.

They are nicely packed in boxes, one dozen each, of 50 pounds weight, suitable for shipping by land or water to any part of the world.

MANUFACTURED ONLY BY

HIRAM HOLT & CO.,

East Wilton, Franklin Co., Maine.

For sale by the Hardware Trade generally.

LATHROP'S

SELF-FEEDING RATCHET DRILL

The only Ratchet drill that combines **Simplicity, Efficiency** and **Durability** with a perfectly reliable and powerful **Self-Feed,** capable of being instantly adjusted to any required cut. We guarantee our Ratchet to do twice the amount of work that can be done by any other ratchet in the market. To responsible parties we send a sample Ratchet for 30 days' trial.

SEND FOR PRICE LIST.

LATHROP & CO.,

NEWARK, N. J.

The Iron Age Directory

and Index to Advertisements.

NEW YORK WHOLESALE PRICES, JUNE 2, 1880.

METALS.

IRON.—DUTY: Bars, 1 to 1½c. ₩ lb; Sheet, Band Hoop and Scroll, 1¼ to 1¾c. ₩ lb; provided, that none of the above Iron shall pay a less rate of duty than 35 per cent. Pig, $7 ₩ ton; Polished Sheet, 3c. ₩ lb; Wrought Scrap, $8 ₩ ton: Cast Scrap, $6 per ton. Railroad 70c. ₩ 100 lbs. Boiler and Plate, 1½c. ₩ lb.

Pig Iron—AMERICAN

Foundry No. 1	(Nominal.)	₩ ton	$23.00 @ 25.00
" No. 2X	"	₩ ton	21.00 @ 22.00
Gray Forge	"	₩ ton	20.00 @ 21.00

SCOTCH.

Eglinton	₩ ton	20.00 @ 21.00
Coltness	₩ ton	23.0 @ 24.00
Glengarnock	₩ ton	22.50
Gartsherrie	₩ ton	21.50

Rails.

Iron (nominal)	₩ ton	$48.00 @ 50.00
Steel (nominal)	₩ ton	58.00 @ 60.00
Old Rails Ts (nominal)	₩ ton	24.50 @ 26.00

Scrap.
Wrought Scrap ₩ ton (nominal) 23.00@25.00

Bar Iron, from Store.—Nominal Prices.
Common Iron:
¾ to 2 in. round and square
1 to 6 in. x ⅜ to 1 in. } ₩ lb 2.60
Refined Iron
¾ to 2 in. round and square
1 to 6 in. x ⅜ to 1 in. } ₩ lb 2.80
1 to 6 in. x ⅛ and 5-16 ₩ lb 3. c
Rods—¾ and 11-16 round and square ₩ lb 3.50
Bands—1 to 6 x 9-16 to No. 13 ₩ lb 3.50
Norway Nail Rods 7. c

Sheet Iron.

Nos.	Common American	R. G. American.
10 to 20	₩ lb 4¼ @	5¾
21 to 24	₩ lb 4⅝ @ 0	6
25 to 26	₩ lb 5¼c	6¼
27	₩ lb 5¼c	6¾
28	₩ lb 5½c	6⅞

	B.B.	2d qual.
Galvanized, 10 to 20	₩ lb 8½c	7½c
21 to 24	₩ lb 9¼c	8¼c
25 to 26	₩ lb 10¼c	9¼c
" 27	₩ lb 11¼c	10¼c
" 28	₩ lb 12½c	11½c

Patent Planished ₩ lb A. 13c; B. 11½c
Russia 14@15 c
American Cold Rolled ₩ lb 7@7½c

COPPER.—DUTY: Pig, Bar and Ingot 1, 1c; Old Copper 4c lb; ₩ Manufactured (including all article of which Copper is a component of chief value), 45 % ad valorem.
American Ingot ₩ lb See Trade Report.

SHEATHING, BRAZIERS' COPPER, BOLTS, &c.

Braziers' Copper, ordinary sizes, 16oz. per sq. ft., and over per lb 31c
Braziers' Copper, ordinary sizes, under 16 oz. and over 12 oz., ₩ sq. ft. ₩ lb 33c
Braziers Copper 10 oz and 12 oz., ₩ sq. ft. ₩ lb 35c
Lighter than 10 oz. ₩ sq. ft. ₩ lb 37c
Circles less than 84 in. in diameter ₩ lb 34c
Circles 84 in. diameter and over ₩ lb 37c
Segment and Pattern Sheets ₩ lb 34c
Locomotive Fire Box Sheets ₩ lb 31c
Sheathing Copper, over 12 oz. ₩ sq. ft. ₩ lb 29c
Bolt Copper ₩ lb 31c
Copper Bottoms ₩ lb 34c
No Copper is Sheathing except 14x48 inches and not to exceed 34 oz. to the sq. ft.

TINNING.

14x48 ₩ sheet 6c
All other size Sheets, 2½c. per square foot.
For tinning both sides, double the above amount.
O'REILL'S PATENT PLANISHED COPPER.—Net.

14 and 16 oz. and heavier	By the case. ₩ lb 35c
12 oz. and lighter	" " ₩ lb 38c

Boiler Sizes.
7 in., 14x42. 8 in., 14x48. 9 in., 14x60.
14 and 16 oz. and heavier. ₩ lb 38c By the case. ₩ lb 37c
(And all sizes not over 30 in. wide.)
30x60.
4 and 16 oz. and heavier ₩ lb 40c
2 oz. ₩ lb 43c

Brass.

Brown & Sharp's Gauge the Standard for Metal; Old English Gauge the Standard for Wire.
BRASS MANUFACTURERS' PRICE LIST.—dis 20%.
Jan. 15, 1880.
Cash prices for Roll and Sheet Brass. For less quantity than 100 lbs. add 3c ₩ lb.

HIGH BRASS.

All Nos. not thinner than to No. 28, wider than 2 in., not wider than 14 in. 33c
All Nos. to No. 28, inclusive, and widths over 14 to 20 in., inclusive. 37c
All Nos. to No. 28, inclusive, and widths over 20 to 30 in., inclusive. 40c
½c ₩ lb advance on each No. above Nos. 28 to 38, inclusive.
All Brass thinner than No. 38 is Platers' Brass, at 45c
Sheets 24x48, and all sheets cut to particular sizes and lengths under 30 in., in width wider than 2 in. 39c
Printers' Rules 47c
Sheets wider than 30 in. and under 40 in. 49c
" 40 in. and over 42c
Circular Sheets, in diam. from 4 in. to 14, inclusive 42c
" " over 14 " 20, " 47c
" " " 20 " 30, " 41c
" " " 30 " 40, " 57c
" " " 40 in. 61c

LOW BRASS.

40 ₩ lb more than High Brass.
Gilding Metal, 8c ₩ lb more than High Brass.
Platers' or Gold Metal { In Bars 50c; Sawed 53c; Planed or Polished 56c
FOR SLITTING.
Metal in width 2 in. to ⅛ in. to No. 28, inclusive, 1c. ₩ lb advance.
Metal, in width 2 in to 1 in., thinner than No. 28, 2c. ₩ lb advance.
Metal, in width 1 in. to ¼ hinner than No. 28, 3c ₩ lb advance
Metal, in width ⅛ in. to ¼, inclusive, not thinner than No. 28, 2c. ₩ lb advance.
Metal, in width ⅛ in. to ¼ thinner than No. 28, 3c. ₩ lb advance.
Metal, ¼ in. in width and less, 10c. ₩ lb advance.
Any of the above widths cut to particular lengths, add 7c. ₩ lb.

GERMAN SILVER MARKET METAL AND WIRE.

	Market Metal.	Wire.
4 per cent., 12 inch, to No. 26	$0.42	$0.72
6 " " "	.56	.86
10 " " "	.64	.88
15 " " "	.74	1.03
18 " " "	.80	1.12

German Silver Sheets over 12in. wide and weighing more than 10 lbs., $2.00 ₩ lb.
Advance 2c. for each additional inch in width above 12 in., and 2c. ₩ lb on each No. thinner than Nos. 26 to 36, inclusive.
All German Silver thinner than No. 36 is Platers, at 50c ₩ lb additional.
German Silver Scrap one-half less than net price of 12 in. Market Metal. German Silver Turnings, Filings and Chips, half the price of Scrap.

BRASS AND COPPER WIRE.

	High Brass.	Low Brass.	Gild'g and Copper.
No. 0 to 20	$0.35	$0.39	$0.15
No. 21	.38	.42	.48
No. 22	.39	.43	.49
No. 23	.41	.44	.50
No. 24	.42	.46	.52
No. 25	.48	.49	.55
No. 26	.47	.51	.57
No. 27	.50	.54	.60
No. 28	.54	.58	.65
No. 29	.57	.61	.68
No. 30	.60	.64	.74
No. 31	.64	.68	.80
No. 32	.68	.72	.86
No. 33	.72	.76	.95
No. 34	.76	.80	1.05

Spring Wire 2c ₩ lb advance.
Flat, Square and Half Round Wire 4c ₩ lb advance on Round Wire.
Fancy Wire not less than 10c ₩ lb advance of Round Wire.
Brass Rods, No. 8 and larger not less than 2 feet lengths, 40c.
Wire straightened and cut, smaller than No. 8, and not less than 2 feet lengths, 46c.
Wire and Rods less than 2 feet lengths, special rates
Twelve cents per lb extra for spooling on 1 lb spools.

MISCELLANEOUS.

Brass Pail Ears $0.42
Brass Door Rail .45

SCRAP.—net.

High Brass Scrap 14c
Low " 10c
Gilding 18c
Turnings, Filings and Chips half the price of Scrap.
Terms—Net cash. Interest to be added after thirty days.

TUBING.—dis 20 %

	₩ lb
Plain No. 20 inclusive above ¾ in. to 3 in.	$0.45
" above 3 in.	.55

Nos. 21, 22, 23, two cents advance on List for each Number.
Nos. 24, 25, 26, four cent advance on List for each Number.
Above No. 26, special rates.
Plain, ¼ inch .72
" ⅜ " 1.12
" ½ " 1.62
Mandrel Drawn Tubes, 5 cents advance on List Prices.
Fancy Tubing to No. 20 53c
English, Scotch and Extra Patterns Fancy Tubing to No. 20 57
Tubing Sawed or Cut 2 to 4 feet long, 2 cents advance on List.
Add to 2 cents ½ cent for each additional cutting under 2 feet.
All Mandrel Drawn Tubes under ¾ in., 25 cents per pound advance.

ZINC TUBING.—net

Plain .29
Fancy .35
Scotch and Extra Patterns .38

GERMAN SILVER TUBING.—dis 10 %

4 Per cent.	.80
6 "	.90
9 "	1.05
12 "	1.20
15 "	1.35
16 "	1.40
18 "	1.50
20 "	1.60

STEEL.—DUTY: Bars, Ingots, Sheets and Coils valued at 7 cents ₩ lb., or under, 2½ cents; over, 7 cents, and not above 11, 3 cents ₩ lb; over 11, 3½ cents ₩ lb, and 10 % ad val. Railway Bars, 1¼ cents ₩ lb. Railway Bars, in part Steel, 1 cent ₩ lb. Provided, that Metal cemented, cast or made from Iron by the Bessemer or pneumatic process, of whatever form or description, shall be classed as

American Cast Steel.

For American Steel see quotations under heading of Pittsburgh.

English Steel.—	
" Best Cast	₩ lb 13½c
" Extra Cast	₩ lb 16½c
" Round Machinery, Cast	₩ lb 10c
" Swaged, Cast	₩ lb 18c
" Best Double Shear	₩ lb 15½c
" Blister, 1st quality	₩ lb 13c
German Steel, Best	₩ lb 11c
" 2d quality	₩ lb 10c
" 3d quality	₩ lb 9c
Sheet Cast Steel, 1st quality	₩ lb 15½c
" 2d quality	₩ lb 14½c
" 3d quality	₩ lb 12½c

ANTIMONY See Trade Report.

LEAD.—DUTY Pig $2 ₩ 100 lbs; old Lead, 1½c lb ₩ Pipe and Sheet, 2½c ₩ lb.

American	5¼ @ 5½c
Bar	7½c dis 10 %
Pipe	7c dis 10 %
Tin Lined Pipe	14c, dis 10 %
Sheet	7½c, dis 10 %
Shot Drop 9½c, Buck, 10½c, dis 10 %	
Chilled Shot 10½c, dis 10	

RABBITT METAL.

N. P. U. ₩ lb 7 @ 80
A. 20c; B, 16c; C. 12c.

TIN.—DUTY: Plates, Sheets, Tagger and Terne, 1.1c ₩ lb; Electro-galvanized Plates, 2c ₩ lb; Manufactures of, not enumerated, 35 per cent. ad. val. Bars, Block and Pigs free. Banca, subject to duty of 10 per cent

Banca	34c
Straits	₩ lb 20c
English	₩ lb 19c

TIN PLATES.

I C 10x14 } Prime Charcoal	$7.50 @ 7.75
I C 14x20 }	
I C 12x12 "	7.75 @ 8.00
I X 10x14 } Charcoal	9.50 @ 9.75
I X 14x20 }	
I X 12x12 " "	10.00
D C 12½x17	7.00 @ 7.25
D X 12½x17	9.00 @ 9.25
For each additional X add	2.00

COKE TIN PLATE.

	Best.	2d quality.	Ordinary
I C 10x14 }	$7.00	6.25 @ 6.50	5.50 @ 6.00
I C 14x20 }			
I C 12x12	7.25	6.25 @ 6.50	5.50 @ 6.25

TERNE PLATE

	Prime Char.	2d qual.	Coke.
I C 14x20	$6.40 @ 6.75	6.25 @ 6.50	6.00 @ 6.25
I X 14x20	8.50		
I C 20x28	14.00	13.50	12.50 @ 13.00
I X 20x28	17.50		
I C 20x20	22.00		
I C 14x20 M. F. Brand			8.75 @ 9.00

SOLDER No. 1, 11c @ 12c; No 2, 10½c

SPELTER—DUTY: in Pigs, Bars and Plates, $1.50 ₩ 100 lbs.

American, cash	6 @ 6¼c
Bergen Port from Lehigh Ore	10c
Lehigh, on spot	6c

ZINC.—DUTY: Pig or Block, 1.50 ₩ 100 lbs. Sheet 2½c ₩ lb.

Sheet, Cask	7½
" Open	8 @ 8¼c

Paper Stock, &c.

(Dealer's Selling Price.)

Canvas linen	@ 5
White cotton, new	4 @
" No. 2	3½c
White linen rags No. 1	5 @
" " No. 2	2¾ @
Seconds	@
Soft woolens	11 @
Gunny bagging	3⅜ @
Jute Butts	3 @ 3½
Kentucky bagging	4½@5
Waste paper and scraps	1 @ 1½
Rope cuttings	1½ @ 3
Kentucky bale rope	4 @ 4½
Grass rope	3½ @ 3¾
Tarred shaking	1¾ @
Hard White Shavings, No. 1	4½ @ 4¾
Soft " " No. 1	4 @ 4½
White Shavings, No. 2	3¾ @
Mixed " part white	3½ @
Imperfections, No. 2, best folded sheets	3¼ @
" No. 1, Heavy Stock	3¼ @
Book Stock	3 @
" Heavy	3½ @ 4
" " Light	1½ @ 1¾
Newspapers	1¾ @ 2
Prints	1½ @
Pure Manilas	3 @ 3¼
Bogus Manilas and Hardwares	$1.25 @ 1.50
Commons	85 @
Binders' Board Cuttings	1.00 @
Straw Board Cuttings, clean	90
Woolen Tailor Clips	18 @ 19
Satinet	3½ @ 3¾

Paints, Oils, &c.

Paints.

Black Lamp, Coach Painters	₩ lb 20c
" " Ordinary	16c
" Ivory Drop, fair	12 @ 14c
" " best	20c
Black Paint, in oil kegs 8c asst'd cans, 11c	
Blue Prussian, fair to best	40 @ 45c
" " " in oil	45 @ 55c
Blue Chinese dry	83c
" Ultramarine	18 @ 30c
Brown, Spanish	1¼c
" Van Dyke	10@12c
Carmine, 40	combination price
Green, Chrome	15 @ 23c
" " in oil	14 @ 18 @ 25c
" Paris good, 25c; best, 30c	
" " in oil 30c; 45c	
Iron Paint, Bright Red	₩ lb 2¼c
" Red	₩ lb 2c
" Brown	₩ lb 1½c
" Purple	₩ lb 3c
" Ground in Oil, Bright Red	₩ lb 5½c
" " " Red	₩ lb 5c
" " " Brown	₩ lb 4½c
" " " Purple	₩ lb 6c
Mineral Paints	1¼ @ 4c
Orange Mineral	10c
Red Lead, American	7½c
" English none in market	
" Venetian (N. C.) dry	$1.65 @ $1.70
" " in oil asst'd cans, 11c; kegs, 8c	
" Indian dry	9 @ 12c
Rose Pink	10 @ 13c
Sienna, American, Raw	4c
" Burnt	4½c
" " in oil	10 @ 16 @ 20c
" Raw	11 @ 14 @ 25c
Umber, Burnt	4 @ 8c
" " in oil	9 @ 12 @ 16c
" Raw	3½ @ 7½c
" " in oil	10 @ 16 @ 18c
Vermillion, Chinese	94c
" English	60 @ 62½c
" Trieste	1.10c
" American, Common	15c
White Lead, American, pure dry	8¼c
" " " in oil	9 to 9½c
White, Paris, English, prime in bbls. 2 @ 2½c	
Yellow Ochre, French	$1.75
" " in oil asst'd cans, 11c; kegs, 8c	
" " Vermont in casks, 1½c	
Yellow Chrome	17 @ 27c
" " in oil	14 @ 18 @ 24c
Zinc White American No. 1, dry	5 @ 5½
" No. 1, in oil	9c
" French (Paris)	8 @ 10c
" in oil	@ 10c

Oils.

Linseed, Raw, in casks and bbls	gal. 70c
" Boiled "	75c
Bleached Whale	₩ gal. 60c
" Sperm	₩ gal. $1.17
" Elephant	65c
Signal	54c
Prime Lard	55c
No. 1	45c
West Virginia	16c @ 22c
Drilling	40c
Empire Cylinder	54c
Miners' Oil	38 to 46c
Fish Oil, pressed	36c
Neatsfoot	73c
Tallow	62c
Machinery	40c
Engine	50c

Sundries.

Asphaltum	9c
Benzine	₩ gal 16c
Chalk	¾c
" Block	¾c
Dryer, Patent, Am'n asst cans, 10½c; keg, 9c	
Frostings	50c
Glue, White	33 @ 44c
" Sheet	20c
Glaziers' Points, Zinc	8c
Gum, Copal	36c
" Damar	20c
" Shellac, English	40c
" " dark	38c
Litharge, English	7½c
Mineral Wool	₩ lb 1¾ @ 1½c
Pumic Stone, selected Lumps	4 @ 6c
" powdered	2½ c
Putty, in bladders	3 c
" in bulk	2½c
Rotten Stone, soft, English	—
Spirits Turpentine	30c
Whiting Spanish	3½c

Glass.

FRENCH WINDOW GLASS.
Prices current per box of 50 feet.

Single Thick.—Discount 50 & 5 %

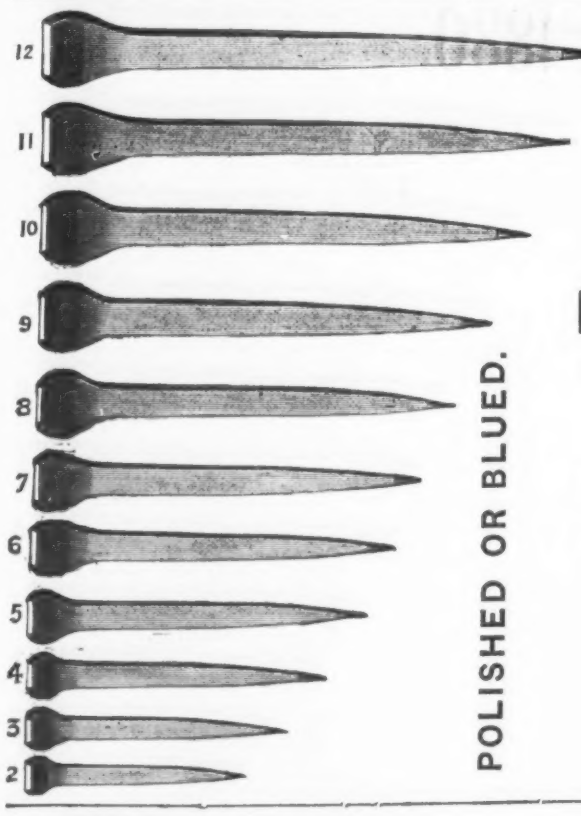
SIZES.	1st.	2d.	3d.	4th
6 x 8 to 10 x 15	$ 8.00	$ 6.75	$ 6.25	$ 5.75
11 x 14 to 16 x 24	8.75	8.00	7.50	7.00
18 x 22 to 20 x 30	11.25	10.50	9.75	8.75
15 x 36 to 24 x 30	12.75	11.50	10.00	
26 x 28 to 24 x 36	13.50	12.25	11.25	
26 x 36 to 26 x 44	14.75	13.75	11.75	
26 x 46 to 30 x 50	16.25	15.00	13.00	
30 x 52 to 30 x 54	17.25	16.00	13.40	
30 x 56 to 34 x 56	18.75	16.75	15.00	
34 x 58 to 34 x 60	19.25	18.00	16.00	
36 x 60 to 40 x 60	21.00	19.50	18.00	

Double Thick.—Discount 60 & 15 %

SIZES.	1st.	2d.	3d.	4 th.
6 x 8 to 10 x 15	$12.00	$11.00	$10.00	$ 9.25
11 x 14 to 16 x 24	14.75	13.75	12.75	11.75
18 x 22 to 20 x 30	19.00	17.75	16.00	
15 x 36 to 24 x 30	21.50	19.25	16.50	
26 x 28 to 24 x 36	23.00	20.75	18.25	
26 x 36 to 26 x 44	24.00	23.00	19.25	
26 x 46 to 30 x 50	27.00	25.00	21.25	
30 x 52 to 30 x 54	28.50	26.00	22.25	
30 x 56 to 34 x 56	30.00	27.75	24.75	
34 x 58 to 34 x 60	31.75	30.00	27.00	
36 x 60 to 40 x 60	35.40	32.50	30.25	

Sizes above 40 x 60—$10.00 per box extra for every five inches.
An additional 10 per cent. will be charged for all Glass more than 40 inches wide. All sizes above 52 inches in length, and not making more than 81 united inches will be charged in the 81 united inches bracket

Gunpowder.



POLISHED OR BLUED.

AUSABLE HORSE NAILS,

Hot Forged and Cold Hammered Pointed,

Are the **only Nails in market** that are made in imitation of the **Hand Process.** They have **the uniformity of Machine** Nails and the **toughness** of those hammered by hand. Our

HOT FORGED AND COLD HAMMERED POINTED NAILS

Are the Standard Nails,

and are **acknowledged to be the best in the market.** They are used by the **best shoers** in **New York, Brooklyn, Philadelphia, Chicago, Saint Louis, Milwaukee, Baltimore,** &c., and

GENERALLY THROUGHOUT THE UNITED STATES.

They also compete successfully in Foreign Countries with machine and hand-made Nails of their own manufacture.

AUSABLE HORSE NAIL CO.,

4 Warren St., New York.

Twisted, Bent and Drawn COLD.

MILLER'S NO. 13 LANTERN

Gives more light and will hold the flame more perfectly than any other Lantern made.

For Prices and Samples, address

Edw'd Miller & Co.,

Meriden, Conn.,

or

35 Warren St.,

New York.

Manufacturers of

Lanterns,
Brass Kettles,
Machine Oilers,
Kerosene Goods,
Tinners' Trimmings,
&c., &c.

BEARDSLEY SCYTHE COMPANY, West Winsted, Conn.

Manufacturers of the well-known brands of

German Steel, Cast Steel and Silver Steel Grass Scythes.

ALSO THE

Clipper, Emperor, Beardsley's Golden Trimmer, Conqueror, Dutchman, Waldron, &c.

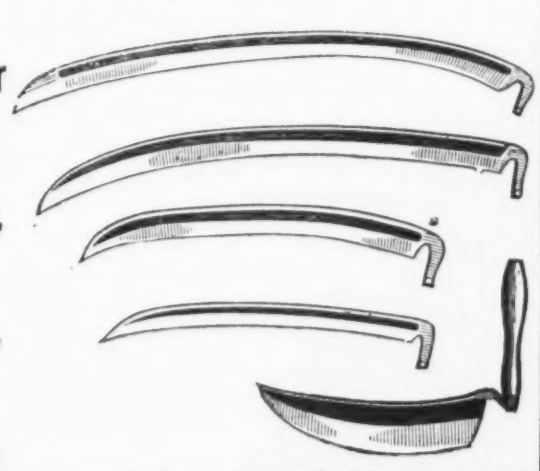
ALSO

Silver Steel, Clipper & Harvest Victor Grain Scythes,

Common Pattern & Spear Point Hay Knives.

ALSO

Corn Knives, Bush & Weed Scythes.



LAMONT PATENT

COMBI-NATION **RAZOR** STROP,

Manufactured by **COPELAND, HALL & Co.**
(Successors to H. O. Hall & Co.),
Rochester, N. Y.

J. WALDRON,
Manufacturer of
Sprout's Double and Single Shear
HORSE FORK,
And
Sprout's
HAY ELEVATORS, PULLEYS and GRAPPLES.
Send for Circulars.
Muncy, Lycoming Co., Pa.

A. J. STEINMAN, Chairman. W. B. MIDDLETON, Supt.
W. G. MENDENHALL, Sec'y & Treas.

OFFICE OF

PENN IRON COMPANY

(LIMITED),

MANUFACTURERS OF

Merchant Bar Iron,

Hammered and Rolled Axles,

Car Forgings, Bridge Work, Fish Joints, Bolts, R. R. Spikes, Bolt Ends, &c., &c.

LANCASTER, PA.

TO STEAM USERS

Save Fuel and Money.

Obtain regular speed and prevent explosion by using

PEERLESS

DAMPER REGULATOR,

the greatest fuel-saving appliance ever invented. Adjustable to any pressure. In ordering mention pressure. Illustrated Catalogue sent on application. We set it up and guarantee performance. Price, $75.

AMERICAN STEAM APPLIANCE CO.

SOLE MANUFACTURERS,

13 and 15 Park Row, NEW YORK.

STAR LOCK WORKS.

ESTABLISHED 1836.

Trunk Locks, Pad Locks, Dead Latches, Door Springs, Trunk Stays, Keys, &c., &c.

110 South 8th St., and Sansom, bet. 8th and 9th, PHILADELPHIA.

PATENTED

Scand. Pad Locks. With Flat Keys. Shackel secured to the Lock Box.

HILLEBRAND & WOLF.

Bergen Port Spelter

MINES: Lehigh Valley, Pa. WORKS & FURNACES Bergen Port, N. J.

The only Miners and Manufacturers of

PURE

LEHIGH SPELTER

From Lehigh Ore.

Especially adapted for

Cartridge Metal and German Silver.

Also manufacturers of

BERGEN PORT OXIDE ZINC.

Superior for LIQUID PAINT on account of its body and wearing properties.

F. OSGOOD & CO., Proprietors.

E. A. FISHER, Agent, 13 Burling Slip, N. Y.

THE FAR-FAMED **AMERICAN LUBRICATOR.** TEN THOUSAND IN USE.

SEND FOR PAMPHLET.

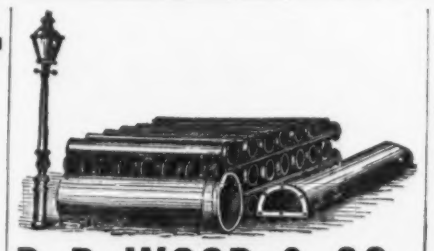
AMERICAN LUBRICATOR CO.
DETROIT, MICH. U.S.A.

SAXTON & PENNELL

RAILROAD SUPPLIES

EXPORT & COMMISSION MERCHANTS

No 91 WILLIAM ST. N.Y.



R. D. WOOD & CO.

Philadelphia,

Manufacturers of

Cast Iron Pipe

FOR WATER AND GAS.

Lamp Posts, Valves, &c.,

Mathew's Pat. Anti-Freezing Hydrants.

400 CHESTNUT STREET.

A. B. GUNNISON,

MANUFACTURER OF

WOOD PUMPS

ERIE, PA.

ESTABLISHED, - 1856.

Warranted Genuine

Cucumber Pumps & Pipe. Also Poplar Pumps, Lined Pumps, &c.

The Trade Supplied by

H. B. GRIFFING, 60 Cortlandt St., N. Y.
CLARK & MACKRATH, General Northwestern Agents, Minneapolis, Minn.
KIRK & DICKSON New Castle, Pa.
KNECHT & THOMAS, Winchester, Ind.

—AND BY—

A. B. GUNNISON

Manufacturer.

ERIE, PA.

THOMAS MORTON,

65 Elizabeth Street, New York,

Manufacturer of Copper and Iron

SASH CHAINS,

With Patent Attachments.

Warranted for years. Chains of any size made to order, and trade supplied with liberal discount.

A. E. DEITZ,

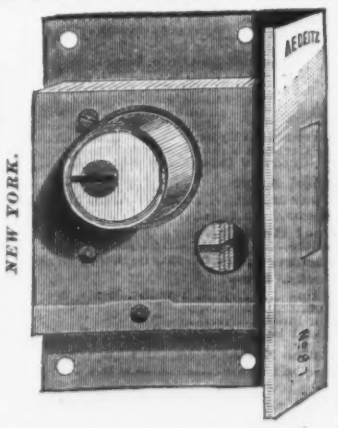
(Successors to Barnes & Deitz,)

Manufacturer of

Store Door Locks, Night Latches, Padlocks, Drawer Locks, &c.,

With FLAT STEEL KEYS.

DURRIE & McCARTY, Agents,
97 Chambers and 81 Reade Sts., NEW YORK.

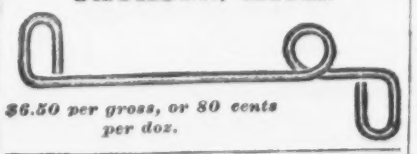


DAVIS' DOOR SPRING

(Patented February 17, 1880.)

M. R. DAVIS, Patentee & Manufacturer,

JACKSON, MICH.



$6.50 per gross, or 80 cents per doz.

TACKLE BLOCKS.

Rope and Iron Strap of all kinds. Lignumvitæ Wood for Ten-Pin Balls.

Wm. H. McMillan & Bro.,

Office, 113 South Street, New York.

Factory, 32 to 40 Penn St., Brooklyn, E. D.

GEORGE W. BRUCE,

1 Platt Street, New York.

Maynard's Planters', Yankee, Hilling and Bog Hoes, also Brades', Elwell's and others. An unrivalled assortment.

Coal.

A. PARDEE, Hazelton, Pa. J. G. FELL, Phila.

A. PARDEE & CO.,

303 Walnut St.,

PHILADELPHIA,

No. 111 Broadway, New York.

MINERS AND SHIPPERS OF

Lehigh Coals.

The following superior and well-known Lehigh Coals are mined by ourselves and firms connected with us, viz.

A. Pardee & Co. { HAZLETON, CRANBURY, SUGAR LOAF.

Pardee, Bro. & Co. LATTIMER.

Calvin Pardee & Co. HOLLYWOOD

Pardee, Sons & Co. MT. PLEASANT.

THE HOBOKEN COAL CO.,

Dealers in

SCRANTON, LEHIGH and other **COALS**

Retail Yard on D. L. & W. Railroad, cor. Grove and 10th sts., Jersey City. Coal delivered direct from shutes to carts and wagons. Families and manufactories supplied with the best qualities of Coal at the lowest rates.

OFFICES: At yard cor. Grove and 10th sts.; cor. Bay st. and Newark av., Jersey City; Room 35, 111 Broadway, N. Y. General Office, Bank Building, cor. Newark and Hudson sts., Hoboken. P. O. Box 247, Hoboken.

New York Wholesale Prices, June 2, 1880.

HARDWARE.

Anvils.
Eagle Anvils American ... ⅌ ℔ 10c dis 20 %
Wright's ... 10¾c @ 11c
Armitage's Mouse Hole ... 9½ @ 9¾c
Trenton ... 10½c

Augers and Bits.
Conn. Valley Mfg. Co / Douglass Mfg. Co / Humphreysville Mfg. Co / Ives / Beecher (French, Swift & Co) / Griswold / Nobles Mfg. Co / Kasson's Patent } dis 40 % from list of Jan 7, 1880.
Cook's, Douglass Mfg. Co ... dis 40&10 %
Snell Mfg. Co's C. S. Augers ... dis 40 %
" B. Machine ... dis 40 %
" C. S. Bits ... dis 40 %
" Jenning's Bits ... dis 35 %
Patent Solid Head ... dis 30 %
Russell Jennings' Auger Dowel, Machine-Dowel and Hand-Rail Bits ... dis 10&10&10 %
Russell Jennings' Augers ... dis 16⅔&10&10&10 %
Russell Jennings' Car and Machine Bits, Boring-Machine and Millwrights' Augers dis 25&10&10&10 %
Imitation Jenning's Bits ... dis 40@45 %
Ives' "Jennings" Bits ... dis 33⅓&10 %
Lewis' Single Twist Bits ... dis 40 %
Andrews Bits ... dis 50 %
Expansive Bits, Clark's, small, $18; l'ge, $26 ... dis 25 %
" " Ives ... $20 @ $30—dis 33⅓ %
" " Blake's ... $20—dis 40 %
" " Parmelee's ... $20 and $30 dis 33⅓ %
Hollow Augers Ives' / " French Swift & Co / " Douglas } dis 15 %
" " Bonney's Adjust., ⅌ doz $48—dis 25&10 %
" " Stearns' Adjust., ⅌ doz $48—dis 20&10 %
" " Ives' Expansive ... each $4.50—dis 30 %
" " Univ'sal Expansive, each $4.50—dis 20 %
Gimlet Bits ... $7.50 ⅌ gross, dis 45 %
" Diamond ... ⅌ doz $1.10 dis 20&10 %
" "Bee" ... dis 45&10 %
Double Cut Gimlet Bits Shepardson's ... dis 40 %
" " Ct. Valley Mfg. Co ... dis 30&10 %
" " Hartwell's ... dis 60&10 %
" " Douglass' ... dis 40 %
" " Ives' ... dis 50 %
Morse's Bit Stock Drill ... dis 25 %
L'Hommedieu's Ship Augers ... dis 15 %
Watrous Ship Augers ... dis 15 %

Awl Hafts.
Sewing Brass Ferrule ... $3.50 ⅌ gross—dis 40&10 %
Peg " ... 3.50 " dis 40&10 %
Patent Sewing, Short ... $1.00 ⅌ doz—dis 40&10 %
" " Long ... $1.40 ⅌ doz—dis 10 %
" Peg Plain Top ... $10.00 ⅌ gross—dis 40&10 %
" " Leather Top ... 12.00 " dis 40&10 %

Awls, Brad Sets, &c.
Awls Sewing, Common ... ⅌ gross $1.70—dis 25&10 %
" Shouldered Peg ... ⅌ gross 2.45—dis 25&10 %
Patent Peg ... ⅌ gross .63—dis 25&10 %
" Shouldered Brad ... ⅌ gross $2.70—dis 25&10 %
" Handled Brad ... $7.00 ⅌ gross—dis 20&10 %
" Handled Scratch ... $7.00 ⅌ gross—dis 20&10 %
" Socket Scratch ... $1.00@$1.25 ⅌ doz—net
Brad Sets, Aiken's ... ⅌ doz $12.00—dis 45&10 %
" No. 42, $10.50; No. 43, $12.50 ... dis 60&10 %
" Stanley's Excelsior, No. 1, $9.60 ... dis 20&10 %
" " " No. 2, 4.80 ... dis 20&10 %
" " " No. 3, 7.80 ... dis 20&10 %

Axes.
Single Bit, 4½ to 5½ and under ... ⅌ doz $11.00 net
" 4½ to 6 and over ... ⅌ doz $11.50 net
" Beveled ... 50 c ⅌ doz advance
Double Bit, 4½ to 5½ and under ... ⅌ doz $22.00 net
" 4½ to 6 and over ... ⅌ doz $23.00 net
" Beveled ... $1.00 ⅌ doz advance

Axle Grease.—Frazer's ... ⅌ ℔ 6c

Axles.
C. H. & Co ... 6c ⅌ ℔ net

Bag Holders.
Sprengle's Patent, per doz. $18 ... dis 40 %

Balances.
All Spring Balances ... dis 15&10 %

Bells.
Hand, Light Brass ... dis 55&10 %
Extra Heavy ... dis 40 %
White Metal ... dis 50 %
" Silver Chime ... dis 10&10 %
" Globe (Cone's Patent) ... dis 15&10 %
Gong, Abbe's ... dis 10&10 %
" Yankee ... dis 20&10 %
" Barton's ... dis 20&10 %
Crank Taylor's ... dis 20&10 %
" Brook's ... dis 40&10&2 %
" Cone's ... dis 10 %
" Connel's ... dis 35 %
Lever, Sargent's, new list Dec., '78 ... dis 60&10 %
" Taylor's Bronze or Plated Lever ... net
" " Japanned Lever ... dis 25&10 %
" R. & E. M. Co.'s ... dis 50&10&2 %
Pull, Brook's ... dis 50&10&2 %
" Western ... dis 25&10 %
Call ... dis 25 %
Cow, Common Wrought ... dis 20&10 %
" Western ... dis 20&10 %
" Sargent's new list ... dis 30&10 %
" Kentucky "Star" ... dis 20&10 %
" " Sargent's new list ... dis 30&10 %
" Dodge's Genuine Kentucky, new list—

Nos.	0	1	1½	2	3	4	5	6	Hog	
	$12.00	10.00	9.00	8.00	6.00	5.00	3.50	2.50	5.00	dis 50 %

" Yaw's Genuine ... dis
" Texas ... dis 20&10
" Wilson's (Moore's) ... dis

Bellows.
Blacksmiths', Common ... dis 45 %
" Extra and Pittsburgh Pattern ... dis 20 %
Moulders ... dis 10 %
Hand Bellows ... List of Dec. 1, 1879, net

Belting, Rubber.
N. Y. Belting and Packing Co ... new list net

Bit Holders.
Extension, Barber's ... ⅌ doz $15.00—dis 40&5 %
" Ives' ... ⅌ doz $15.00—dis 40 %
Diagonal ... ⅌ doz $24.00—dis 40 %
Angular ... ⅌ doz $24.00—dis 40 %

Blind Adjusters.—Domestic ... ⅌ doz $3.00, dis 5 %

Blind Fasteners.—Mackrell's ... dis 30 %
Van Sand's ... No. 2000, per gross, $10.00 ... dis 10 %
" old pattern ... ⅌ gross, $9.00 net
Washburn's Patent ... ⅌ gross $11.50 net
Merriman's ... new list net
Mackrell's ... ⅌ doz. pairs, $0.65, dis. 10 %

Blind Staples.
Barbed, ⅜ in. and larger ... ⅌ ℔ 13½c net
" ¼ in ... ⅌ ℔ 18c net

Blocks.—Burr & Co ... dis 20& 10%
Differential Pulley Blocks ... dis 20 %
Penfield Block Works, Rope and Iron Strap'd ... dis 40 %
Wrot. Iron Com. bushed ... dis 25 %
all steel roll'r ... dis 10 %
Sheaves ... dis 35 %
Stanley R. & L. Co., Rope and Iron Strap'd dis 33⅓&10 %

Bolts
Cast Iron Barrel, Shutter, &c ... dis 40&10 %
Cast Iron Chain (Sargent's list) ... dis 60&10 %
Bush's Lever and Chain Bolts ... dis 40 %
Wrought Barrel ... dis 40&10 %
Square ... dis 40&10 %
" Shutter, all Iron, Stanley's list ... dis 45 %
" " Brass Knob, " " ... dis 20&10 %
" " Sargent's list ... dis 40&10 %
" Sunk Flush, Sargent's ... dis 60&10 %
" " Stanley's ... dis 30 %
" B.K.Flush, Com'n, Stanley's ... dis 45 %
" " Ex. Heavy, " ... dis 40 %
" "Plated Knob & Slide Flush" ... dis 40&10 %
Carriage and Tire, Common ... dis 60&5 %
" " Philadelphia, new list ... dis 60 %
" " Philada. Pattern ... dis 60 %
" Shelton's ... (old list) dis 55 %
R. B. & W. Carriage (old list) ... dis 55 %
Tire, Am. Screw Co.'s, Phila, new list, Nov 1, '79, dis 60 %
" Bay State ... dis 80 %
" R. B. & W., new list ... dis 60 %
Stove—American Screw Co.'s ... dis 37½ %
" R. B. & W ... dis 37½ %
Plow ... dis 40 %
" R. B. & W ... dis 40 %
Machine, List of July 15, '79 ... dis 45&50 %
Bolt Ends " ... dis 45&50 %

Borax ... 11½@12½c ⅌ ℔ net

Boring Machines. Upright. Angular.
First quality, no Augers ... $5.50 $6.75 dis 33⅓ %
Phillips' with Augers ... 10.00 dis 40 %

Braces.—Barber's Patent ... dis 40&5 %
Q. S. Backus ... dis 60 %
Wilson Mfg. Co ... dis 10 %
Spofford's Patent ... dis 50&5 %
Noble's Patent ... dis 40&5 %
Ives' Patent Braces ... dis 50&10 %
Common Ball (American) ... dis 40&10 %

Brackets.—Shelf (Sargent's) ... dis 40&10 %

Bright Wire Goods list of Dec. 15, 1879, dis 50&10 %

Bull Rings.—Union Nut Co ... dis 50&20 %
Sargent's ... dis 60&10 %
Hotchkiss' ... low list dis 35%
Humason Beckley & Co.'s (low list) ... dis 0 %

Butts.
Wrought Brass ... dis 30 %
Cast Brass, Tiebout's ... dis 30 %
Corbin's ... dis 40&10 %
Fast Joint, Narrow ... dis
" Broad ... dis
Loose Joint ... dis
" Japanned ... dis
" with Acorns ... dis
Parliament Butts ... dis
Mayer Hinges ... dis
Loose Pin no Acorn ... dis
Acorns ... dis
" Japanned ... dis
" Plated Tips ... dis } See Trade Report.

WROUGHT IRON.
Fast Joint Narrow ... dis 25&10 %
Lt. Narrow ... dis 25&10 %
Broad ... dis 25&10 %
Loose Joint, Broad ... dis 25&10 %
Table Butts, Back Flaps, &c ... dis 25&10 %
Inside Blind, Regular ... dis 25&10 %
" Light ... dis 30&10 %
Loose Pin, Wrt ... dis 35&10 %
Spring Hinges:
American Spiral Spring Butt Co., Jap'd ... dis 25 %
" " " " Fancy ... dis 20 %
Gem Spiral Spring Butts, Japanned ... dis 25 %
" " " " Ornamental ... dis 20 %
Geer's Single and Double Acting ... dis 25 %
Sabin Mfg. Co.'s Double Acting ... dis 35 %
Union Spiral Spring, Japanned ... dis 25 %
" " Ornamental ... dis 20 %
Union Spring Hinge Co.'s ... dis 25 %
American Spring Hinge Co.'s ... dis 25 %
Union Mfg. Co ... dis 25 %
Bommer's ... dis 25 %
Blind Butts, Parker ... dis 50&10 %
Palmer ... dis 30&10 %
Seymour ... dis 50&10 %
" Shepard's "Double Locking" Nos. 1 & 2 ... dis 50 %
" Shepard's "Noiseless," Nos. 50 & 60 ... dis 50 %
" Lull & Porter ... dis 55&10 %
" Nicholson ... dis 40&10 %
" Huffer ... dis 35&10 %
" Clark's, Nos. 1, 3, 5 ... dis 60&10 %
" Sargent's No. 12 ... dis 50&10 %

Bow Pins.
Hotchkiss' ... low list net
Humason, Beckley & Co.'s (low list) ... dis 50 %
Sargent & Co's ... $19.70 and $21.40, dis 50&10 %

Butchers' Cleavers.
Humason & Beckley Mfg. Co ... dis 20 %
Bradley's ... dis 25 %
Beatty's ... dis 25&5 %

1	2	3	4	5	6	7	8
$16.50	19.00	21.50	24.00	27.00	30.00	33.50	36.50

Can Openers.
Messenger's Comet ... ⅌ doz $3.00, dis 25 %
American ... ⅌ doz $2.00, dis 70 %
Duplex ... ⅌ doz 25c, dis 15@20 %
Lyman's ... ⅌ doz $3.75, dis 20 %
No 4, French ... ⅌ doz $2.25, dis 50 %
No. 5, Iron Handle ... ⅌ gross $7.50 net
Eureka ... ⅌ doz $2.50, dis 10 %
Sardine Scissors ... ⅌ doz $7.00, dis 55 %
Star ... ⅌ doz $5.00, dis 10 %
Sprague ... dis 50 %

Caps—Percussion, ⅌ 1000.
U. M. C., F. C. trimmed ... 50c / " F. L. ground ... 70c } dis 10 %
G. D. & S. B ... 36c, dis 7½ %
Double Waterproof, in 1-10's ... $1.40 / Colt's Pistol, " ... 70c } dis 10&5 %
F. L ... 50c / E. B. 1-10, Trimmed ... 64c / E. B. 1-10 Ground Edge ... 70c } dis 10&5 %
Musket, in 1-10's ... 60c net

Cartridges.—Metallic ... dis 50 %

Cards.—Horse and Curry ... dis 10 %
Cotton ... dis 10 %
Wool ... dis 10 %

Car Pusher.—"Giant" ... $6.25 each, dis 20 %

Carpet Stretchers.
Cast Steel, Polished ... ⅌ doz $5.00, dis 30 %
" Iron Steel Points ... ⅌ doz $2.00, dis 30 %

Casters.
Bed ... dis 20&10 %
Plate and Shallow Socket ... dis 20&10 %
Deep Socket ... dis 20&10 %

Cattle Leaders.
Humason, Beckley & Co.'s (low list) ... dis 50&10 %
Sargent's ... dis 50&10 %

Chain.
Trace, 6½-1-2 ... ⅌ pair 79c / 6½-10-3 ... ⅌ pair 70c / 7-10-2 ... ⅌ pair 86c } dis
German Halter Chain, New list Oct. 22, '79 ... dis 20 %
" Coil, New list Oct. 22, '79 ... dis 20 %
Covert Halter, Hitching and Breast ... dis 35 %
Oneida Halter Chain ... dis 30 %
Galvanized Pump Chain ... ⅌ ℔ 10c net
Jack Chain, Iron ... dis 50 %
" Brass ... dis 40 %

Chalk.
White ... ⅌ gross 60c net
Red ... ⅌ gross 80c net
Blue ... ⅌ gross 100c net
White Crayons ... ⅌ gross 150 net

Chisels.
Socket Framing, Crossman ... dis 55&10 %
" Buck Bros ... new list, dis 22½ %
" Merrill ... dis 60 %
" Witherby Tool Co ... dis 60 %
" Douglass' ... dis 60 %
Firmers, Crossman ... dis 55&10 %
" Buck Bros ... new list, dis 22½ %
" Merrill ... dis 60 %
" Witherby Tool Co ... dis 60 %
" Douglass' ... dis 60 %
" Corner ... dis 60 %
Tanged Firmers extra ... dis 33⅓@40 %
" " Butcher's ... $5.00 @ $5.25 to £
" " Spear & Jackson's ... 5.00 to £
" " Buck Bros (Shank) ... 5.25 to £

Clamps.
Iron, Providence Tool Co.'s, Wrt. Iron ... dis 25 %
" Adjustable, Gray's ... dis 20 %
" " Lambert's ... dis 20 %
" " Snow's ... dis 40&5 %
" " Hammer's ... dis 15 %
" " Stearns' ... dis 15&10 %
" Cabinet, Sargent's ... dis 55&10 %
" Carriage Makers', Sargent's ... dis 55&10 %
" Cord and Tape (T. & S. Mfg. Co.) ... dis 30 %

Clips, Axle.
Norway or Best ... dis 40&5 %
Superior ... dis 40&5 %

Coal Hods.
Griffiths ... dis 20 %

Cockeyes ... 1¼ in., 28c.; 1⅜ inch, 33c.; 1⅝ in., 47c, net

Cocks, Brass.
Racking ... new list, Jan. 1, '80 / Globe " " / Plain Bibbs " " / Ale and Beer " " } dis 25 & 10 %

Coffee Mills.
Board and Box ... new list, Jan., 1880, dis 35 %
Increase Wilson's ... net
Selsor's Pat ... $9.50, $10.50, dis 25 %
American (Enterprise Mfg. Co.) ... dis 15 %
French Steel ... dis 20 %
The Swift (Lane Bros.) ... dis 0 %

Combined Dinner Pail and Lantern.
Per doz $15.00 ... dis 30 %

Compasses, Dividers, &c.
Compasses ... dis 45 %
Callipers ... dis 45 %
Dividers ... dis 45 %
Bemis & Call Co.'s Dividers ... dis 60&5 %
" " Compasses & Callipers ... dis 50&5 %
" " Wing & Inside or Outside ... dis 50&5 %
" " Double ... dis 60 %
" " Call's Pat. Inside ... dis 30 %
Cook's ... dis 25 %
Excelsior ... dis 50 %
Miller's Patent ... dis 25 %

Coopers' Tools.
Bradley's ... dis 15 @ 20 %

Corkscrews.—Humason & B ... dis 33⅓ %

Corn Knives and Cutters.—Bradley's ... dis 10 %
Wadsworth's ... dis 33⅓ %

Crow Bars.
Cast Steel ... ⅌ ℔ 8¼c
Iron, Steel Points ... ⅌ ℔ 6¼c

Curling Irons, &c.
⅛, ¼, ⅜ in., $1.80 2.00, 2.40 ... dis 10 %
Curling Tongs ... ⅌ doz $3.65, dis 10 %
Pinching Irons ... ⅌ doz 7.50, dis 20 %

Curry Combs.
Fitch's (List of No. 240, $1) ... dis 40 %
Hotchkiss' Novelty ... dis 20 %
Lawrence ... dis 30&10 %
Lawrence, with detachable Mane Comb ... dis 25&10 %
Rubber ... ⅌ doz $10.00, dis 15 %

Curtain Pins.—Silvered Glass ... net
White Enamel ... net

Cutlery.
Meriden Cutlery Co. (Table) ... net
Am. Miller Bro.'s Cutlery Co ... dis 25 %
Humason & Beckley, Pocket ... dis 30 %
F. W. Rogers & Son, A. A ... dis 40&5&5 %
Naugatuck Cutlery Co ... list net
Aaron Burkinshaw's Pocket ... dis 25 %

Dog Collars.
Embossed Gilt ... dis 20 %
Leather ... dis 30 %
Brass ... dis 25 %

Door Springs.
Torrey's Rod ... ⅌ doz $2.25, net
Gray's " ... ⅌ doz $2.00, net
Bee Rod ... ⅌ doz $2.00, net
Gem (Coil)—
No. 1, Large, Japanned ... ⅌ doz $3.50 / No. 2, Medium, ... ⅌ doz 2.50 / No. 3, Small ... ⅌ doz 2.00 } list net

Challenge (Coil)—	Nos. 9	7	6	
Japanned ... ⅌ doz	$2.00	2.50	3.50	dis 10 %
Coppered ... ⅌ doz	4.00	4.50	5.00	
Galvanized ... ⅌ doz	3.50	4.00	4.50	
Nickeled ... ⅌ doz	5.50	6.00	7.00	

Star (Coil)—For Cop'd, Nickel-Plated, &c. see list.
No. 4, ("Shoo Fly") Screen door size ⅌ doz $1.80 / No. 5, Screen Door Size ... ⅌ doz $2.00 / No. 6, Medium ... ⅌ doz 2.50 / No. 7, Large ... ⅌ doz 3.50 } dis 20 %
Sabin's Lever .. No. 1, $1; 2, $1.50; 3, $2; 4, $2.50; dis 30 %
Sabin's Boss ... No. 1, $5.40; 2, $4.20; 3, $3.00, dis 50 %
Sabin's Crown ... ⅌ doz $2.75, dis 50 %
Philadelphia ... 5 in., $5.00; 8 in., $7.00, dis 35 %
Barker's Concealed ... dis 20 %
Cowell's ... No. 1, $18.00; No. 2, $15.00 ⅌ doz, dis 50 %
Rubber, complete ... ⅌ doz $1.80, net

Drawing Knives.
Crossman's No. 1 ... dis 55&10 %
Merrill ... dis 60 %
Nobles Mfg. Co ... dis 15 %
Bradley's ... dis 35 %
Adjustable Handle ... dis 20 %
Witherby Tool Co ... dis 60 %
Douglass ... dis 60 %

Drills and Drill Stocks.
Blacksmiths' ... each $3.50 net
Blacksmiths' Self Feeding ... each $7.50, dis 15 %
Breast, P. S. & W ... dis 20 %
" Hotchkiss ... dis 20 %
Breast, Wilson's ... dis 20 %
" Miller's Falls ... each $3.00, dis 25 %
Bartholomew's ... each, $2.50 dis 25&10 %
Ratchet, Merrill's ... dis 20 %
" Ingersoll's ... dis 25 %
" Whitney's ... dis 15 %
" Weston's ... dis 20 %
Moore's Triple Action ... dis 20 @ 25 %
Whitney's Hand Drill ... dis 50 %
Wilson's Drill Stocks ... dis 10 %
Automatic Boring Tools ... each $2.25, dis 20 %

Drill Chucks.—Morse's Beach Patent ... dis 30 %
" Adjust. each $10.00, dis 30 %
Danbury ... $8.00, dis 30 %

Egg Beaters.
Dover ... ⅌ doz. $2.50 net
National ... ⅌ do 33⅓ %
Family ... per gross $33; per doz., $3.00 net

Elevator Buckets.
Mill E. Buckets, light, 3½ to 10 in. (Duc's Improved) ⅌ 100 $15.00 @ $54.00, net
Mill E. Buckets, heavy, 5 to 10 inches (Duc's Improved) ⅌ doz $5.60 @ $10.20 net
Storehouse, (Duc's Patent) 12 to 17, $12.00 @ $20.00 ... net

Emery and Emery Paper.
Genuine Chester—Regular Nos ... ⅌ ℔
" " Flour and FF ... ⅌ ℔
" " in 10-lb. cans ... 2c extra
Washington Mills—Regular Nos ... ⅌ ℔ 8c
" Flour ... ⅌ ℔ 5c
Wellington Mills, Grain ... ⅌ ℔ 10c net
" " Flour ... ⅌ ℔ 8c net
Hampden Emery Grain ... 5c net
" Flour ... 3c net
B. & A. Emery Paper ... dis 20@25 %

Enameled and Tinned Ware.
Kettles ... dis 50 %
Sauce Pans ... dis 35&5 %
Tinned Sauce Pans ... dis 35&5 %

Escutcheon Pins.
Iron ... dis 20 %
Brass ... dis 35 %

Escutcheons.
Door Lock ... Same discounts as Door Locks
Brass Thread ... dis 60&10 %
Wood ... dis 25 %

Faucets.
Fenn's ... dis 40 %
Fenn's Cork Stops ... dis 33⅓ %
Star ... dis 55&10 %
Frary's Patent Petroleum ... dis 20&10 %
Wood and Metallic ... dis 40 %
West's Patent Key ... dis 45 %
Metallic Key, Leather Lined ... dis 40 %
Cork Lined ... dis 70 %
Enterprise (Self Measuring) ... ⅌ doz, $36.00, dis 15 %

Felloe Plates ... ⅌ ℔ 10c, dis 5 %

Files.
Auburn ... $5.00 to £, dis 35 %
Arcade ... $5.00 to £, dis 20 %
E. M. Boynton's ... new list, dis 25 %
Nicholson ... (Nicholson List) dis 20 %
Madden & Cockayne File Co ... dis 20 %
Heller & Bros new list) ... dis 10 %
Hiscox File Mfg. Co., new list ... dis 20 %
J. & Riley Carr ... 4.50 to £
Johnson & Bro ... dis 20 %
Butcher's ... 4.50 to £
Walter Spencer & Co.'s "Diamond" ... 4.50 to £
Fisher's ... 4.75 to £
Moss & Gamble ... 4.50 to £
H. Disston & Sons (new list) ... dis
Western (new list) ... dis 20%
Limet & Co. (French) ... $4.25 to £

Fluting Machines.
Knox, 4-inch Rolls ... $3.25 each / " 6 " " ... 4.00 " / " 8 " " ... 6.50 " } dis 10 %
Peerless, 4-inch Rolls ... 4.00 each net
" 8 " " ... 4.75 each net
Eagle, 3½-inch Roll ... $2.15, dis 10 %
" 5½ " " ... $2.85, dis 10 %
Eureka, No. 1, 7-inch Roll ... 6.00 each, dis 10
" No. 2 5-inch Roll ... 4.00 each, dis 10 %
Crown .. 4½-in. $3.50; 6-in., $4.00; 8-in., $6.50 each dis 10 %
Star ... 4½ in., $4.00; 6 in., $5.00 each dis 10 %
Crown Jewel ... 6 in., $3.40 each, dis 10 %
American, 5 in., $3; 6 in., $3.40; 7 in., $4.50 each, dis 10 %
Domestic Fluter ... 1.50 each net
Geneva Hand Fluter, No. 1 ... ⅌ doz $15, dis 20 %
Crown Hand Fluter, Nos. 1, $15.00; 2, $12.50; 3, $10.00 ⅌ doz ... dis 10 %
Shepard Hand Fluter ... No. 75 ⅌ doz $15, dis 10 %
" " " No. 90, $9.00; No. 110, $7.25;
" " " No. 100, $6.00 ⅌ doz ... net
Clark's Hand Fluter ... ⅌ doz $15.00, dis 20 %
Combined Fluter and Sad Iron ... ⅌ doz 15.00, dis 30 %
Buffalo ... ⅌ doz 10.00, dis 10 %

Fluting Scissors ... dis 45 %

Forks.
Hay, Manure and Spading ... dis 25 %
Plated "A 1, Rogers & Bro ... dis 40&5 %
" Reed & Barton ... dis 40&5 %

Fruit and Jelly Presses.
Enterprise Mfg. Co ... dis 15 %

Fry Pans.
Burnished, list as follows ... dis 4 %

No.	0	1	2	3	4	5	6	7	8
⅌ doz.	$3.00	$3.75	4.25	4.75	5.25	6.00	7.00	8.00	9.00

Gauges.
Marking, Stanley's ... dis 45&10 %
" Chapin's ... dis 50&10 %
Wire ... dis 10 %
" Smith's Patent ... ⅌ doz $18.00, dis 40 %

Gimlets.
Nail and Spike ... dis 40@45 %
"Bee" Gimlets ... ⅌ gross $12.00 dis 60 %
"Eureka" Gimlets ... dis 50 %
"Diamond" Gimlets ... dis 40 %
Double Cut Shepardson's ... dis 40 %
" " Hartwell's ... dis 50 %
" " Ives' ... dis 50 %
" " Douglass' ... dis 40%

Glue Pots.
Tinned and Enameled ... dis 30 %
Family, Howe's "Eureka" ... dis 40 %
" L. F. & C.'s "Handy" ... dis 25 %

Grindstone Fixtures.
Sargent's Patent ... dis 40&10 %
Reading Hardware Co ... dis 10%
" " "Keystone" ... dis 10&10 %

Gun Wads.
U. M. C. B. E. 11 up ... $2.00
" " 9 & 10 ... 2.30
" " 7 & 8 ... 2.00
" P. E. 11 up ... 3.10
" " 9 & 11 ... 4.00
" " 7 & 8 ... 4.90 } dis 5&5 %

Halters.
Covert's Pat. Rope ... dis 50 %
Horse and Cattle Ties, Covert's ... dis 50 %

Hammers.
Maydole's ... dis 15 %
Cheney's ... dis 25 %
H. Hammonds (new list Jan. 20, '80) ... dis 20 %
Verree ... dis 5 %
Magnetic Tack, Nos. 1, 2, 3, $1.25, 1.50 and 1.75, dis 20&10 %
Warner & Noble's ... dis 10 %
Kip's (old list) ... dis 20 %
Yerkes & Plumb ... dis 15 %

Hand Cuffs and Leg Irons.
Providence Tool Co.'s Hand Cuffs, $15.00 ⅌ doz / " " Leg Irons, $25 ⅌ doz } dis 10 %
Tower's ... dis 25 %

Handles.—Door or Thumb Latches—

Nos.	0	1	2	3	4	
Per doz.	$0.80	1.00	1.18	1.35	1.50	dis 50@55 %

Roggin's Latches ... per doz 45c@50c net
Bronzed Iron Drop Latches ... ⅌ doz 60 @ 80c net
Jap'd Store Door Handles—Nuts, $1.80; Plate $1.20 no Plate, 96c ... net
Barn Door ... per doz $5.00, dis 45&10 %
Wrought Chest ... dis 50&10 %
Surface Chest, Sargent's list ... dis 50&10 %
Flush Chest ... dis 50&10 %
Lifting ... dis 45&10 %
Saw and Plane ... dis 40&10 %
Boynton's Pat. Loop Saw Handles ... dis 25 %
" " Centennial Saw Handles ... dis 25 %
Hammer and Hatchet ... dis 20 %
Brad Awl ... ⅌ gross $2.00, dis 20&10 %
Hickory Firmer Chisel, assorted, ⅌ gross $4.50
" " " large, " 5.00
Apple " " assorted, " 5.00
" " " large, " 6.00
Socket " " assorted, " 3.00
" Framing " assorted, " 5.00
File, assorted, ⅌ gross ... 2.75
Auger, assorted, ⅌ gross ... 6.00
" large, " ... 7.00 } dis 20&10 %
Patent Auger, Ives' ... dis 25
" Douglass' ... ⅌ set $1.25, net
" Swan's ... ⅌ set $1, net

Hangers.
Barn Door ... dis 40&10 %
Novelty ... dis 40 %
Challenge ... dis 50 %
Climax (Anti-Friction) ... dis 40 %
Sterling Improved (Anti-Friction) ... dis 55&10 %
Cheritree ... dis 40 %
Kidder's ... dis 40 %

Harness Snaps.
Henshaw's ... List of 1⅛ changed to 14.00, dis 55&2 %
Judd's ... " " " 14.00, dis 55&2 %
Fitch's (Bristol) " " " 14.00, dis 40 %
Hotchkiss' ... dis 10 %
Andrews' ... dis 50 %
Sargent's ... dis 50&10 %
"German ... dis 60&5 %
Covert ... dis 40 %

Hatchets.
Isaiah Blood ... dis 15 %

Shingling,	Nos. 1 2 3	⅌ doz	$7.25	$8.00	$8.75
Claw,	Nos. 1 2 3	⅌ doz	7.75	8.50	9.25
Lathing,	Nos. 1 2 3	⅌ doz	7.50	8.00	8.50

Hunt's ... dis 15 %

Shingling,	Nos. 1 2 3	⅌ doz	$7.25	$8.00	$8.75
Claw,	Nos. 1 2 3	⅌ doz	7.75	8.50	9.25
Lathing,	Nos. 1 2 3	⅌ doz	7.50	8.25	9.00

Hurd's ... dis 25 %

Shingling,	Nos. 1 2 3	⅌ doz	$8.00	$8.50	$9.00
Claw,	Nos. 1 2 3	⅌ doz	9.00	9.50	10.00
Lathing,	Nos. 1 2 3	⅌ doz	8.00	8.50	9.00

Yerkes & Plumb ... dis 15 %

Shingling,	Nos. 1 2 3	⅌ doz	$7.50	$8.00	$8.50
Claw,	Nos. 1 2 3	⅌ doz	8.25	8.75	9.25
Lathing,	Nos. 1 2 3	⅌ doz	7.50	8.00	8.50

Simmons's ... dis 20 %

Shingling,	Nos. 0 1 2 3	⅌ doz	$7.50	$8.00	$8.50	$9.00
Claw,	Nos. 1 2 3	⅌ doz		9.00	9.50	10.00
Lathing,	Nos. 1 2 3	⅌ doz		8.00	8.50	9.00
Broad,	Nos. 1 2 3 4	⅌ doz	9.00	10.00	12.00	14.00
"	Nos. 5 6 7 8	⅌ doz	16.00	18.00	20.00	22.00

Collins ... dis 10 %

Shingling,	Nos. 1 2 3	⅌ doz	$6.00	$6.50	$7.00
Claw	Nos. 1 2 3	⅌ doz	6.50	7.00	7.50
Lathing,	Nos. 1 2 3	⅌ doz	6.00	6.50	7.00

Hay Knives.
"Lightning" ... ⅌ doz $20.00 net
Wadsworth's ... dis 33⅓

Hinges.
Gate, Western ... ⅌ doz $10.00, dis 40&10 %
" N. E ... ⅌ doz $10.15, dis 40&10 %
" N. E. Reversible ... ⅌ doz $6.50, dis 40&10 %
Gate, Clark's No. 1 ... ⅌ doz $0.00, dis 40 %
" N. Y. State ... ⅌ doz $0.10, dis 50&10 %
" Automatic ... ⅌ doz $12.50 dis 40 %
" Common Sense ... dis 10 %
" Seymour's ... dis 40&10 %
" Shepard's ... Nos. 10, 20 & 25, dis 40 %
Rolled Blind Hinges ... dis 40&10 %
Rolled Plate ... dis 40&10 %
Rolled Raised ... dis 40&10 %
Wrought Strap and T, list Dec. 20, '77 ... dis 25&10 %
Plate Hinges / "Providence" } 8, 10 & 12 in. $7.50 ⅌ 100 ℔ / over 12 in. $6.25 ⅌ 100 ℔ } ... dis 10 %
Screw Hook and Strap ... { 6, 8, 10, 12 in., $8.00 ⅌ 100 ℔ / 14 to 36 in., $6.75 ⅌ 100 ℔ } dis 10 %
Heavy Welded Hook { 8 to 12 in., $8.00 ⅌ 100 ℔ / 14 in. & up, 6.75 ⅌ 100 ℔ } dis 10 %
Screw Hook and Eye ... { ⅜ & 1 in., 90 / ⅝ in. 90 / ½ in. 10c / ⅜ in. 12c } net

Hoes.—Solid Shank, C. S ... ⅌ doz $8.00, dis 25
Socket ... ⅌ doz 9.00, dis 25 %
Grub ... dis 15 %
Planters' ... dis 35 %
Scovill Pattern ... dis 33⅓ %
Scovill Pattern, Handled ... dis 25 %
Hick's Pat. Solid C. S. Planters' ... dis 20&10 @ 30 %
" " Scovill Pattern dis 20&5 @ 35 %
Winsted & Lane, Planters ... dis 25 %
" Scovill Pattern ... dis 20@25 %

Hooks.
Bird Cage, Sargent's list ... dis 50&10 %
Cotton ... dis 50 %
Cotton, Patented (N. Y. Mallet & Handle Wks), dis 30
Cotton (Humason & Beckley Mfg. Co.) ... dis 40 %
Belt, (new list Dec. 24, 1879,) ... dis 55&10
Bench—Hotchkiss', $5.00 ⅌ doz ... net
" Weston's, No. 1, $10.00; No. 2, $9.00 ⅌ doz dis 25
" McGill's, $3.00 ⅌ doz ... dis 10
" Skinner's, $6.25 per doz ... dis 20
Clothes Line Sargent's list ... dis 40&10
" " Reading list ... dis 10&10
Ceiling .. } Sargent's list ... dis 40&10 %
Harness. } Reading list ... dis 5&10 %
Coat and Hat, Sargent's list ... dis 40&10 %
" " Reading ... dis 15&10 %
" " T. & S. Mfg. Co's list ... dis 25 %
Picture Hooks, Brown's Pat. Solid Brass, $4 per gross ... dis 25 %
Tassel (T. & S. Mfg. Co.) ... dis 40 %
Wrought Staples and Hooks and Staples ... dis 0 %
" Staples, Stanley's list ... dis 50&10 %
Wire Screw Hooks and Eyes, new list ... dis 50&10 %
Grass and Bush ... dis 40@45 %
Whiffletree—Patent ... dis 45 %
Hooks and Eyes—Malleable Iron ... dis 50&10 %
" Brass ... dis 50&10 %

Horse Nails

	Nos. 5	6	7	8	9	10	
Ausable ... ⅌ ℔	30c	27c	25c	24c	23c	22c	dis 20 %
" Finished, Polished or Blued ... "	31c	28c	26c	25c	24c	23c	

A. C. ...	60	50	40	30	27	25	23	22	21	21	20	20c	dis 15 %
Nos ...	1	2	3	4	5	6	7	8	9	10	11	12	

	Nos. 5	6	7	8	9	10	
H. P. Pointed and Finished	26	23	21	20	19	18	dis 20 %
National, Pointed and Polished, Pat. Fin	28	25	23	22	21	20c	%
Putnam Hammer, P't'd	29	26	24	23	22	21c	%

Horse Shoes.—Burden ... ⅌ keg $4.37½
R. I. Horse Shoe Co., Perkins' Improved Light, Medium and Heavy ... ⅌ keg 4.37½
Mule Shoes ... ⅌ keg 5.37½

Ice Awls, Chisels, &c.
American Ice Chisel ... ⅌ doz. $3.50 net
National " ... ⅌ doz $0.25 dis 20 %
Novelty Ice Breakers ... ⅌ doz $6.25 dis 30 %
White's Sliding Head Picks ... ⅌ doz $2.50 dis 40 %
Dunlap's Ring Picks ... ⅌ doz $2.. dis 40&10 %
Wood Head Picks, Sargent's ⅌ doz $1.85, dis 60&10&10 %
Iron " ⅌ doz 1.85, dis 60&10&10 %
Ice Mallets Pick in Head ... ⅌ doz 1.75 net
Pick in Handle ... ⅌ doz 3.00 net
Ice Axes, Small, Cast or Malleable ... ⅌ doz 1.20 net
Kitchen Ice Tongs ... ⅌ doz 2.25 net
Combination Ice Tools ... ⅌ doz $200 net

Kettles.
Brass, 7 to 13 inches inclusive ... ⅌ ℔ 35c net
Brass, larger than 13 inches ... ⅌ ℔ 38c net
Enameled ... dis 40 %

Knives.
Ames' Butcher Knives ... dis 20 %
" Shoe ... dis 15 %
" Bread ... ⅌ doz $1.50, dis 15 %
Moran's Shoe and Bread Knives ... dis 20 %
Hay and Straw— Wadsworth's ... dis 33⅓ %
Table and Pocket ... See Cutlery

Knobs.
Carriage (Jap'd 8oc. ⅌ gross) ... dis 50 %
Base—Common ... dis 30&10%
Hemacite Door Knobs ... New list, dis 35&5 %
Door, Mineral / " Por. Jap'd / " " Plated / " " Por } Same discounts as Door Locks.
Furniture, Plain ... 75c gross inch, dis 10 %
" Wood Screws ... dis 20 %

Picture (T. & S. Mfg. Co.) ... dis 40 %
" Sargent's ... dis 45&10 %
Hemacite Picture ... dis 35 %
Shutter, Porcelain ... dis 50 %

Ladles.
Melting—Sargent's ... dis 40&10 %
" Reading ... dis 10&10 %
" Monroe's Patent ... ⅌ doz $4.00, dis 25 %

Lanterns.
Tubular ... No. 0, $9.65; No. 1, $11.30 / With Guards 35c extra. } net
Hurricane No. 2 ... ⅌ doz $5.75, net
Peerless ... No 5, ⅌ doz $11.75, dis 10&10 %
Brady's Patent ... dis 10&10 %
Ætna ... dis 10&10 %
Yankee ... dis 10&10 %
De Beque ... dis 10&10 %
Police ... Small, $7.00; Med., $8.25; Large, $12.00, dis 10 %
Convex Reflector ... $2.75 ⅌ doz, dis 10 %

Lemon Squeezers.
Porcelain Lined ... ⅌ doz $6.00—dis 30 %
Wood ... ⅌ doz 3.00—dis 30 %
Eureka, Tinned ... ⅌ doz $8.00, dis 10 %
Dunlap's Improved ... ⅌ doz $4.00 net
Sammis' ... No. 1, $7.00; No. 2, $12.00 ⅌ doz., dis 45 %
Townsend's Patent ... $6.00 ⅌ doz., dis 33⅓ %

Lines.—Linen Fish ... dis 25&10 %
Cotton Chalk ... dis 55 %
Sil. Lake Chalk ... Nos. 0, 1, 2, 3, $6.00, $6.50, $7.00, $7.50 ... dis 15&10 %
Mason's Linen ... dis 25&10 %
Wire Clothes, Galvanized ... each 20 @ 40c net

Locks and Latches.
Cabinet—Eagle / " Gaylord / " Bridgeport } Old list restored, March 1880—dis 10&2 %
" A. E. Deitz ... dis 30 %
Trunk ... dis 10 %
Langstroth & Crane's List Jan. 1 '77.
Round Key, No. 1 to 5 ... dis 40&10 %
" No. 5½ to 12 ... dis 40& 10 %
Flat Key ... dis 33⅓&10 %
A. E. Deitz, Flat Key ... dis 30 %
Yale Lock Co., Flat key ... dis 20 %
"Shepardson" or "U. S." ... dis 35 %
"Felter" or "American" ... dis 33⅓ %
Plate ... dis 20&5&2 %
F. Many's "Extension Cylinder" ... $10.50 ⅌ doz, net
DOOR LOCKS, &C
Branford / Norwalk / Norwich / P. & F. Corbin / Russell & Erwin / Mallory, Wheeler & Co / Reading Hardware Co / Trenton Lock Co } New list.
Padlocks—Russell & Erwin / " Mallory, Wheeler & Co / " Wm. Wilcox & Co } ... dis 33⅓ % and 2 % for cash
" Yale Lock Mfg. Co.'s "Standard" ... dis 40 %
" Romer's ... dis 30 %
" Conestoga ... dis 60 %
" J. H. McWilliams ... dis 10 %
" A. E. Dietz ... dis 35 %

Mallets.—Hickory ... dis 10&10
" Lignumvitæ ... dis 10 %

Meat Cutters.
Dixon's (P. S. & W.) Nos. 1 2 3 4
⅌ doz .. $14.00 17.00 19.00 30.00—dis 25 %
Miles' Challenge ... Nos. 1 2 3
⅌ doz .. $22.00 30.00 40.00—dis 25 %
Perry's Nos. 1 2 3 4 4 g'rd 5 g'rd
Each ... $3.00 4.00 5.00 11.00 13.00 36.00—dis 25 %
Woodruff's (P. S. & W.) ... Nos. 100 160
⅌ doz $15.00 18.00 dis 25 %
Hales' ... Nos. 11 12 13
⅌ doz .. $36.65 44.40 56.60 .. dis 40&2&10 %
Draw Cut ... Nos 5 2 6 8 10
Each .. $50.00 75.00 80.00 225.00 400.00—dis 20 %
American ... dis 25 %
Nos ... 1 2 3 4 B 5
Each ... $5.00 7.00 10.00 25.00 50.00 60.00
Silver & Deming ... dis 25 %
Pennsylvania ... dis 40 %
Nos ... 1 2 3
⅌ doz ... $24.00 28.00 36.00
Beef Shavers (Enterprise Mfg. Co.) ... dis 25 %

Mincing Knives.
Am., 1 blade, $12; 2 blades, $21; 3 blades, $30 per gross.
Lathrop's ... dis 25 %
Smith's ... per doz $1.75, dis 10 %

Molasses Gates.
Stebbins Pattern ... dis 50&10 %
Genuine ... dis 47½&10 %
" Tinned Ends ... dis 40&10 %
Chase's Hard Metal ... dis 60&10 %
Bush's ... dis 20 %
Lincoln's Pattern ... dis 50&10 %
Weed's ... dis 15 %

Nails ... See Trade Report

Nuts and Washers.
Square Nuts ... 5½@6c off list
Hexagon Nuts ... 5½@6c off list
Washers ... 5¼@5½c off list

Nut Crackers
Table (Humason & Beckley Mfg. Co.) ... dis 33⅓ %
Blake's Pattern ... ⅌ doz $2.60, dis 10 %
Turner & Seymour Mfg. Co ... dis 50 %

Oakum.
Best ... ⅌ ℔ 10½c
U. S. Navy ... ⅌ ℔ 9½c
Navy ... ⅌ ℔ 8c

Oilers.—Zinc and Tin ... dis 45 %
Brass and Copper ... dis 40 %
Olmsted's ... dis 40 %
Broughton's ... dis 40 %
Malleable (Hammer's) ... ⅌ doz $5.00, dis 10 %
Prior's Patent or "Paragon" Zinc ... dis 45 %
" " Brass ... dis 40 %

Ox Balls ... dis 40&10%

Pencils.
Faber's Carpenters' ... High list, dis 40&10 %
" Round Gilt ... ⅌ gross $5.25 net
Dixon's Lead ... ⅌ gross 4.50 net
" Lumber ... ⅌ gross 6.75 net

Packing, Steam.
N. Y. Belting and Packing Co ... new list net

Picture Nails.
Brass Head, Sargent's List ... dis 35&10 %
" T. & S. Mfg. Co ... dis 40 %
Porcelain Head, Sargent's List ... dis 35&10 %
" " Judd's List ... dis 30 %
Porcelain Head, T. & S. Mfg. Co ... dis 30 %
Niles' Patent ... dis 40 %

Pinking Irons ... ⅌ doz 75c, net

Plaiting Machines.
Magic ... ⅌ doz $10.00, net
Astor Plaiting Machine ... each $15.00, dis 20 %
Crown Plaiting Machines ... dis 25 %
6in., $6.00. 10in., $10.00 each

Planes and Plane Irons.
Bench, First Quality ... dis 25&10 %
" Second " ... dis 30&10 %
Moulding ... dis 25&10 %
Bailey's (Stanley R. & L. Co.) new list Jan. '79, dis 20&10 %
The Stanley (S. R. & L. Co.) " " dis 20&10 %
Bailey's "Victor" ... dis 20&10 %
Defiance Adjustable ... dis 20&10 %
Plane Irons, Butcher's ... $5.50 to £
" Buck Bros ... $6.00 to £
" Auburn Tool Co.'s ... dis 5&10 %
" Middletown Tool Co ... dis
" Ohio Tool Co ... dis 5&10 %
" Sandusky Tool Co ... dis 5&10 %

Pliers and Nippers.
Button's Patent ... dis 33⅓ %
Hall's Pat. Compound Lever Cutting Nippers No. 2; 5 in., $20; No. 4, 7 in., $30 ⅌ doz ... dis 25 %
Humason & Beckley Mfg. Co ... dis 33⅓ %
Gas Pliers ... dis 50 %
Eureka Pliers and Nippers ... dis 25 %
Russell's Parallel ... dis 25 %
P. S. & W. Cast Steel ... dis 30 %
" End Cutting Nippers ... dis 25 %
" Tinners' Cutting Nippers ... dis 15 %

Plumbs and Levels.
Disston's ... dis 65 %
Stanley R. & L. Co.'s Pat. Adjustable ... dis 60&10 %
" " Non-Adjustable ... dis 50&10 %
Chapin's Patent Adjustable ... dis 60&10 %
" Non-Adjustable ... dis 60&10 %
Standard Rule Co.'s New Adjustable ... dis 60&10 %
" Non-Adjustable ... dis 60&10 %
Johnson's Patent Adjustable ... dis 60&10 %
Pocket Levels ... dis 60&10 %

Post Hole and Tree Augers.
Samson Post Hole Digger ... per doz $37.50, dis 20 %
Fletcher Post Hole Augers ... ⅌ doz 36.00, dis 20 %
Vaughan's Post Hole—
6 in. $23.60; 7, 8 and 9 in. $25 per doz ... dis 15 %

Potato Parers, &c.
Bay State ... ⅌ doz $13.00 dis 10 %
"Saratoga" Peeler and Slicer ... ⅌ doz $9.00 net

Pruning Hooks and Shears.
Disston's Combined Pruning Hook and Saw per doz $19.00, dis 20 %
" Pruning Hook ... " 13.50, dis 20 %
E. S. Lee & Co.'s Pruner ... dis 30 %
Pruning Shears ... ⅌ doz $5.50@$6.00

Pulleys.
Hot House and Tackle ... dis 50&10 %
Jap'd Screw ... dis 50&10 %
Brass Screw ... dis 45&10 %
Jap'd Side ... dis 50&10 %
" Clothes Line ... dis 50&10 %
Hay Fork Solid Eye, $4.50; Swivel, $5.00, dis 20&10 %
" " "Anti-Friction," ... $7.50 dis 20&10 %
" " "F" Common and Pat. Bushed ... dis 20 %
" " Tarbox Pat. Iron ... dis 20 %
Shade Rack ... dis 50 %

Punches.
Belt or Drive ... ⅌ doz $2.00; 2.25; 2.50, dis 40 %
Bemis & Call Co.'s Cast Steel Drive ... dis 50&5 %
" " Springfield Socket ... dis 50&5 %
Spring ... ⅌ doz $7.00, dis 45 %
Leach's Patent ... dis 15 %
Bemis & Call Co.'s Spring and Check ... dis 40 %
Solid Tinners' ... ⅌ doz $1.44, dis 25 %

Rail.
Sliding Door Wrought Brass.....₩ ℔ 45c dis 20 %
" " Iron, Painted .₩ foot 9c. dis 40&10 %
Barn Door ⅛, ⅝ and ⅞ inch.....dis 55&10 %
" for N. E. Hangers.....dis 55&10 %

Razor Straps.
Genuine Emerson.....dis 40
Badger's Emerson.....dis 40
Badger's (not Emerson).....dis 25 %
Evans'.....dis 40 %
Imitation Emerson.....₩ doz $2.75, dis 40&10 %
Hunt's.....dis 40&5 %
Chapman.....dis 15 @ 20 %
Saunder's.....dis 10 %
Torrey's.....dis 20 %

Rivets.
Iron and Tinned.....dis 40 %
In bulk, list of May 21.....dis 20 %
Copper Rivets and Burs.....dis 25 %

Nos..	7	8	9	12	13	14	15
₩ ℔..400	500	52c	54	58c	60c	65c	70c

Tinned Iron Belt Rivets.....dis 25 %
Rivet Sets......dis 25 %

Rods.
Stair.....New list, March 1, '79, dis 10 %
" American Patent.....dis 40 %

Rollers.
Barn Door, Sargent's list.....dis 55&10 %
Novelty.....dis 10 %
Acme (Anti-Friction).....dis 40 %

Rope. Manufacturers' Net List, Dec. 10, 1879.
Manila.....½ inch and larger ₩ ℔ 14½c
".....⅜ inch ₩ ℔ 15 c
".....¾ and 5-16 inch ₩ ℔ 15½c
Tar'd Rope.....₩ ℔ 14 c
" " Lath Yarn.....₩ ℔ 14 c
" Hay Rope.....₩ ℔ 14½c
Sisal.....½ inch and larger ₩ ℔ 13 c
".....⅜ inch ₩ ℔ 13½c
".....¾ and 5-16 inch ₩ ℔ 14 c
" Hay Rope.....₩ ℔ 13 c

Rules.

	Boxwood.	Ivory
Chapin's..	dis 55 & 10 %	dis 15 &10 %
Standard		
Stanley		
Stephens		

Sad Irons.
From 4 to 10 lbs.....₩ ℔ 4½c net
Self Heating.....₩ doz $2.50 net
" Tailors'.....₩ doz $18.00 net
Gleason's Shield and Toilet.....dis 25 %
Enterprise Patent Cold Handle.....dis 20 %
Mrs. Pott's Pat. Cold Handle, "Crown".....dis 20 %
Combined Fluter and Sad Iron..per doz $15.00, dis 15 %

Sand Paper.
Baeder & Adamson's Flint, 00 to 1½..$4.75 ₩ ream
" " " 2, 2½ & 3.. 4.25 ₩ ream
" " " Assorted 4.75 ₩ ream
" " Star..... 3.75 ₩ ream
" " Emery..₩ ream $6.50 @ 11.50
dis 20@25 %
New England, same list as B. & A. Flint.... dis 20@25 %
Gage's.....dis 20&5 %

Sash Cord.
Common.....₩ ℔ 14 @ 20c net
Patent.....₩ ℔ 10c net
Silver Lake Russia Flax.....₩ ℔ 6 c. dis 10 %
" White Cotton.....₩ ℔ 6oc. dis 10 %
" Drab Cotton.....₩ ℔ 65c. dis 10 %
Raw Hide.....dis 25 %
Steel Ribbon.....dis 10 %

Sash Locks.
Clark's, No. 1, $10.40; No. 2, $8.00 per gross.....dis 33⅓%
Ferguson's.....dis 33⅓ %
Walker's.....dis 10 %
Hammond's Window Springs.....dis 25 %
Northup Window Springs.....$3.00 per gross, dis 10 %
The Perfect, Clark & Smith, Plain Jap'd ₩ gro $10.00 net
" " Por. Knob Jap'd. ₩ gro 14.00 net
" " Nickel-Plated...₩ gro 27.00 ne

Sash Weights.—Solid Eyes, in 500 ℔ lots and over.....₩ ℔ 2¼c net

Sausage Stuffers or Fillers.
Miles.....₩ doz $20, dis 30 %
Perry.....₩ doz, No. 1, $15; No. 0, $21, dis 25 %
Braw Cut No. 4.....each $30.00, dis 20 %
Enterprise Mfg. Co.....dis 15 %
Silver's.....dis 25 %

Saws.
Disston's Circular.....dis 35 %
" Mill.....dis 35 %
" Cross Cut.....dis 20 %
" Hand, Panel, Rip, &c.....dis 20 %
Boynton's Lightning, Cross Cuts, new list.....dis 20 %
" One-Man, all lengths, " .....dis 20 %
" Billet Webs, 30 in. " .....dis 25 %
" Lightning Buck Saws X Par.....dis 25 %
" Lightning Hand, Panel and Rip.....dis 25 +
Wheeler & Clemson Mfg. Co.'s Hand.....dis 20 %
W. M. & C. Mfg. Co. Cross-Cuts, except Monarch, dis 20 %
Livingston's Butcher and Kitchen.....dis 20 %
" Framed Wood—

Nos....	101	102	103	104	105
Per doz..$10.00		8.40	12.00	7.40	6.25 net

Saw Frames.
White, Vermont.....₩ doz $1.35, dis 25 %
Red, Polished and Varnished.....₩ doz $2.00, dis 25 %
Saw Rods.....$10 list dis, 10&10 %

Saw Sets.
Boynton's Patent X Cut, per doz. $12.00; Hand Saw, per doz., $10.00.....dis 20 %
Stillman's Genuine.....₩ doz $2.60@$4.90 net
" Imitation.....₩ doz $3.25, dis 20&10 %
Common Lever.....per doz $2.00, dis 20&10 %
Leach's.....No. 0, $8.00; No. 1, $15.00, dis 15 %
Nash's.....No. 1, $8.50; No. 2, $6.50, dis 20 %
Hammer, Hotchkiss.....$6.50, dis 10 %
" Bemis & Call Co.'s New Pat.....dis 40&5 %
Bemis & Call Co.'s Lever & Spring Hammer..dis 30&5 %
" " Plate.....dis 10 %
" " Cross Cut.....dis 12½ %
Aiken's Genuine.....$13.00, dis 60&10 %
" Imitation.....$7 00, dis 10 %
Hart's Patent Lever.....dis 20 %
Disston's.....dis 20 %

Scales.
Hatch, Counter, No. 171.....₩ doz $36, dis 15&10 %
" Tea, No. 161.....₩ doz $15.00 dis 33⅓ %
Union Platform.....$6.00, dis 40 %
Fairbanks'.....dis 20 %
Buffalo Scale Co.....dis 40 %
Howe's.....dis40 %
Chatillon's Grocers'.....dis 40 %
" Eureka.....dis 25 %
Family Universal.....dis 50%
" Favorite.....dis 30 %
" Turnbull's.....dis 30 %
Scale Beams, Chatillon's list.....dis 10 %
" Sargent's list.....dis 35&10 %

Scrapers.
Adjustable Box Scraper (S. R. & L. Co.), $6.00.dis 20&10 %
Box, 1 Handle.....₩ doz $5.00, dis 10 %
" 2 " .....₩ doz 6.00 dis 10 %
Defiance Box and Ship.....dis 20&10 %
Foot.....dis 70&10 %
Ship (common).....per doz $3.00 net
" (Providence Tool Co.....dis 10 %

Screw Drivers.
Douglass Mfg. Co.....dis 20&10&10 %
Disston's.....dis 50 %
Disston's Patent Excelsior.....dis 50 %
Buck Bros.....dis 25 %
Stanley Rule & Level Cos., Varnished Hdls..dis 45&10 %
" " " Black Handles...dis 35&10 %
Sargent & Co.'s.....dis 40&10 %
Gay's Double Action Ratchet per doz., 4 in., $3.00; 5 in., $10.20; 6 in., $12.00 dis 30 %

Screws.
Flat H'd Iron.....dis 35 %
Round Head Iron.....dis 25 %
Flat Head Brass.....dis 25 %
Round Head Brass.....dis 10 %
Brass and Silver Capped.....dis 40 %
Japanned, list of Plain Screws.....dis 20&10 %
Lag or Common Coach.....dis 40@45 %
Coach Patent Gimlet Point, List per 100....dis 40&45 %
Bed.....dis 60@10 %
Machine, Flat Head, Iron, Am. Screw Co.....dis 60 %
" Round Head, Iron, " .....dis 55 %
Bench, Iron.....dis 40&10 %
" Wood, Beech .....₩ doz $3.00, dis 15 %
" Hickory.....dis 20&10 %
Hand.....dis 20&10 %
Hand Rail, Sargent's.....dis 55&10 %
" " Humason, Beckley & Co's.....dis 33⅓ %
" " Am. Screw Co.....dis 35 %
Jack (Wilson's).....dis 35 %

Screw Window Balances.
R. B. Hugunin's, Single gro., $23.94; 5 gro. $22.68, dis 5 %

Shears and Scissors.
Cast Iron, (American).....dis 50&10 %
Pruning.....See Pruning Hooks and Shears.
Barnard's Lamp Trimmers.....₩ doz $3.75
Tinners'.....dis 15 %
Cast Steel, List, Nov. 25, 1879.....dis 80 %
Seymour's " .....dis 60 %
Heinsch's " .....dis 60 %
" Tailors' Shears.....dis 33⅓ %

Sheaves.
Sliding Door, M. W. & Co., list.....dis 33&2 %
" R. & E. list.....dis 60&10&2 %
" Patent Roller.....dis 10 %
" " " Hatfield's..dis 55&10 &2 %
" Russell's Anti-Friction ....dis 55&10&2 %
" Moore's Anti-Friction.....dis 40 %
Sliding Shutter, R. & E. list.....dis 60&10 &2 %
" " Sargent's list.....dis 50&10 %
Moore's Anti-Friction (Hanging).....dis 40 %
Philadelphia Hanging.....dis 40&5&2 %

Shovels and Spades.
Ames, New list, Jan. 26, 1880.....dis 10 %
Hussey Binns & Co., Patent.....dis 15 %
" Association List.....dis 5 %
Old Colony (changes in list Oct. 15, '79).....dis 15 %
Remington's (Lowman's Patent).....dis 25 %
Rowland's.....dis 40 %
Griffiths.....dis 40 %

Shovels and Tongs.
Iron and Brass Head, R. & E. list.....dis 50&10&2 %
Polished Steel.....new list, dis 30&5&10&2 %

Slates.
Square Frames.....by case.....dis 70 %
Less than a case.....dis 65&10 %

Spoke Shaves.
Defiance Metallic.....dis 20&10 %
Iron.....dis 30 %
Wood.....dis 30 %
Bailey's (Stanley R & L. Co.) new list.....dis 20&10 %

Spoke Trimmers.
Bonney's.....₩ doz $10.00 dis 40&5 %
Stearn's.....₩ doz $10.00, dis 40 %
Ives'.....No. 1, $15.00; No. 2, $12.00 ₩ doz, dis 50&10 %
Douglass'.....₩ doz $9.00, dis 15 %

Spoons.
Pat. Thread Basting.....dis 30 %
" Riveted Table and Tea.....dis 40 %
Solid Table and Tea.....dis 50 %
Britannia.....dis 55 %
The Wm. Rogers Mfg. Co.....dis 33⅓&5&5 %
Reed & Barton.....dis 33⅓&5&5 %
Hall & Elton.....dis 33⅓&5&5 %
Holmes, Booth & Haydens.....dis 33⅓&5&5 %
German Silver.....dis 25&10 %
Cast Steel, Sil. Plated.....dis 33⅓ %
Tin (P. S. & W.), Teas.....$1.25 ₩ gross, net
" " Tables.....$2.00 ₩ gross, net
Tin Cowles Hdw. Co.).....dis 10 %
" " " case lots.....dis 20 %

Stocks and Dies......dis 5&10 %
"Lightning" Screw Plate.....dis. 10 %

Stone.
Hindostan Hacker Stone.....₩ gross $12.00 dis 10 %
Sand Stone.....₩ ℔ 0c. dis 33⅓&10 %
Washita Stone.....No 1, ₩ ℔ 18c net
" .....No 2, ₩ ℔ 15c net
" Slips.....No. 1, ₩ ℔ 36c net
Washita Stone (Boyd & Chase).....No. 1 ₩ ℔ 15c net
" " Slips (Boyd & Chase).....30c net
" " mo'ted (Boyd & Chase) 0, 7 & 8 in, dis 30 %
" " No. 2.....₩ ℔, 13c, net
" " No. 2.....₩ ℔ 14c net
Arkansas Stone No. 1, 4 to 6 in.....℔ ₩ $1.35 net.
" " No 1, 6 to 9 in.....℔ ₩ $2.00 net
Turkey Oil Stone (Boyd & Chase)....4 to 8in, $1.20 ₩ ℔, dis 10 %
" Slips " ....$2.50 ₩ ℔, dis 10 %
Lake Superior (Boyd & Chase).....₩ ℔ 20c, dis 10&5 %
" " Slips " .....₩ ℔ 45c, dis 10&5 %
Grindstones, Family, Loring's.....dis 10 %

Stove Polish.
Joseph Dixon's.....₩ gross $5.75 net
Gem.....₩ gross $1.50, dis 10 %
Gold Medal.....₩ gross $6.00, dis 25 %
"Mirror".....₩ gross $6.00, dis 5 %
Ruby.....₩ gross $3.75, net
Rising Sun.....₩ gross $5.75, net
Dixon's Plumbago.....₩ ℔ 8c. net

Squares.
Steel.....dis 50 %; full cases, dis 50&10 %
Iron.....dis 50 %; full cases, dis 50&10 %
Nickel Plated.....add $2.50 @ $4.00 ₩ doz, net
Try Squares and T Bevels.....dis 45&10 %
Star Try Squares and Bevels.....dis 35 %
Diston's Try Squares and T Bevels.....dis 50 %
Winterbottom's Try and Mitre.....dis 20&10 %

2 % cash

Tacks, Brads, &c.
List of Oct. 21, 1879:
Tinned Swedes Tacks.....dis 35 %
Tinned American " .....dis 45 %
Swedes Tacks, all kinds.....dis 20 %
Copper Tacks and Nails.....dis 25 %
Swedes Hungarian Nails.....dis 20 %
American " .....dis 20 %
Gimp and Lace Tacks.....dis 20 %
Finishing Nails.....dis 15 %
Trunk and Clout Nails.....dis 15 %
Common and Patent Brads.....dis 10 %
Basket Nails.....dis 15 %
Brush Tacks.....dis 10 %
Leathered Carpet Tacks.....dis 20 %
American Cut Tacks.....dis 20 %
Cigar Box Nails.....dis 20 %
Chair Nails.....dis 20 %
All other Tack List goods.....dis 20 %
Double-Pointed Tacks.....dis 40&5 %

Extra 10% on all.

Tap Borers.
Common and Ring.....dis 15 %
Ives' Tap Borers.....dis 15&10 %
Enterprise Mfg. Co.....dis 15 %

Tapes, Measuring.
American.....dis 10 %
Spring Tapes.....dis 25&10 %

Thermometers.
Tin Case.....dis 70 %

Tobacco Cutters.
Enterprise Mfg. Co. (Champion).....dis 15 %
Wood Bottom.....₩ doz $12.00, dis 33⅓ %
All Iron.....₩ doz $10.50, dis 40 %
Nashua Lock Co.'s.....₩ doz $18.00, dis 50 %
Toe Calks.—Winsted.....₩ ℔ 9c. dis 5 %

Tinners' Tools and Machines.
Machines (P. S. & W.).....list add 12½ %
Tools (P. S. & W.).....dis net

Transom Lifters.
Wollensak's Patent.....dis 20 %

Traps.
Game Newhouse.....dis 30 %
" Newhouse Pattern.....dis 45 %
" Blake's Patent.....dis 40 %
Mouse, Wood, Choker.....₩ doz holes, 16½c
" Round Wire.....₩ doz $1.50, dis 10 %
" Cage " .....₩ doz $2.50, dis 10 %
" Catch-em-alive.....₩ doz $2.50, dis 10 %
Rat. "Decoy".....per doz $10.00, dis 10 %

Trowels.
Lothrops Brick and Plastering.....dis 10@15 %
Reed's Brick and Plastering.....dis 15 %
Diston's Brick and Plastering.....dis 15 %
Peace's Plastering.....dis 30 %
Clement & Maynard's.....dis 10@25 %
Rose's Brick.....dis 15 %
Brades' Brick.....dis 20 %
Worrall's Brick and Plastering.....dis 10@15 %
Garden.....dis 45 %

Triers.
Butter and Ch ese.....dis 25%

Vises.
Solid Box.....List of July 1, '79 dis 25 %
" "Crown" (A. H. Hildick) 40 to 100 ℔, 15c net
" Peter Wrights.....15½c
Parallel, Parker's.....dis 10 %
" Wilson's.....dis 30 %
" Howard's.....dis 25 %
" Merrill's.....dis 15 %
" Sargent's.....dis 40&10 %
" Trenton.....dis 20 %
" Backus and Union.....dis 25 %
" Fisher & Norris.....dis 15&10 %
" Stevens'.....dis 25 %
" Simpson's Adjustable.....dis 25 %
"Family." List.....net
Saw Filers, Bonney's.....₩ doz $24.00, dis 20&10 %
" Stearn's.....dis 20&10 %
" Hopkins'.....₩ doz $17.50 dis 10 %
Lowell Hand Vises.....dis 20 %
Richardson's Vise and Anvil.....dis 20 %

Washer Cutters.
Smith's Patent.....₩ doz $12.00 dis 20 %
Johnson's.....₩ doz $12.00, dis 33⅓ %
Penny's.....₩ doz $14.00 and $16.00, dis 45 %
Appleton's.....₩ doz $5.00, dis 20&10 %

Washers.—See Nuts and Washers.

Well Wheels.—Revised list.....dis 60&10%

Wire.

Brass and Copper.....	List of Jan. 15, 1880....	dis 20 %
Bright and Annealed.....	Nos. 0 @ 18.	dis 42½ @ 42½ %
" "	Nos. 19 @ 26,	dis 52 @ 52½ %
" "	Nos. 27 @ 30.	dis 55 @ 57½ %
Coppered.....	Nos. 0 @ 18.	dis 35 @ 37½ %
Galvanized, Nos. 0 to 6.....		₩ ℔ 10c, dis 30 @ 32½ %
" Nos. 7 to 18.....		market list, dis 20 @ 22½ %
Tinned, Nos. 0 to 18.....		dis 25 @ 27½ %
Cast Steel.....		dis 25 @ 30 %
Tinned Broom Wire, Nos. 18 to 26.....		dis 42½ @ 45 %
Annealed Fence, Nos. 8 and 9		dis 35 @ 37½ %
" Grade, Nos. 10 to 14.		dis 40 @ 42½ %
Galvanized Telegraph, Nos. 7 to 9		₩ ℔ 9c
" " Nos. 10 and 11.....		₩ ℔ 10c
" No. 12		₩ ℔ 10 @ 5c
Fence Staples.....		₩ ℔ 7½ @ 7½c
" Staples, Galvanized.....		₩ ℔ 8½ @ 8½c
Stubs Steel Wire.....		$7.00 to £
Japanned Barb Fence.....		₩ ℔ 14c
Galvanized "		₩ ℔ 15c
Steel Music Wire, Nos. 12 to 27.....		₩ ℔ $1.25, net
Turner & Seymour Mfg. Co., Picture Wire..dis 80&20 %		
Judd's Picture Wire.....		dis 80&20 %
Clothes Line Wire, Galvanized.....		₩ coil 45 %
Wire Cloth, green and drab.....		₩ sq. ft, 3¾ @ 4 c net

Wrenches.
American Adjustable.....dis 45 %
Baxter's Adjustable "B,".....list J an., 1880, dis 20
" Diagonal.....dis 20
Coes 'Genuine.....dis 33⅓ %
" "Mechanics".....dis 33⅓&10 %
" Pattern, Malleable.....dis 05 %
Girard Standard.....dis 40 %
Girard Agl.....50 %
Davis' Patent Duple X.....new list, dis 2
Bemis & Call's Patent Combination.....dis 20 %
" " Merrick's Pattern.....dis 35 %
" " Briggs' Pattern.....dis 25 %
" " Cylinder or Gas Pipe.....dis 40 %
Van Wagoner & Williams' Basin .....per doz $4.50
Aiken Pocket (Bright).....$6.00, dis 60&10 %
The Favorite Pocket (bright).....per doz $3, dis 60 %
Webster's Pat. Combination.....dis 35 %

Wringers.

		Per doz.
Universal, XX	No. 3½	63.00
" "	No. 2,	66.00
" "	No. 1½	74.00
" "	No. 1,	93.00
" "	No. 8, ...	each 14.00
" "	No. 12.	" $20.00
" "	No. 18.	" 25.00
" "	No. 22.	" 32.00
Peerless, No. 0, no Cogs.		54.00
" No. 1,	"	57.00
" No. 2½	with Cogs.	63.00
" No. 2,	"	66.00
" No. 3,	"	74.00
" No. 4,	"	96.00
nique, No. 0.		54.00
" No. 1.		57.00
Crown No. 2.		57.00
" No. 2½		66.00
" No. 3		72.00
Eureka, No. 1.		60.00
Novelty, No. 10, with Cog Wheels.		62.00
" No. 2,		66.00
Excelsior, No. A, with Folding Bench.		78.00
" No. E, for Set Tubs.		69.00

Stamped Tinware.—New List Jan. 10, 1880.
Common Stamped Ware.....dis
Stamped Deep and Betinned Ware.....dis

Steel.

WOLFF, KAHN & CO.,

SUCCESSORS TO

R. H. WOLFF & CO.,

MANUFACTURERS, IMPORTERS, EXPORTERS & GENERAL MERCHANTS

MANUFACTURERS OF

CAST STEEL WIRE for all Purposes, Special Wire, Market Steel Wire, Prime Coppered Spring Wire, and of all Kinds of Furniture Springs, &c.

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CRESCENT STEEL,

In Bars, Sheets, Cold-Rolled Strips, &c.

Polished, Compressed Drill Rods and Wire,

Warranted equal to any imported in *quality, finish and accuracy.*

Also Common Grades.

Established 1810.

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"DOG BRAND" FILES.

Also of Superior

STEEL

Drills, Cold Chisels, Tools, Taps, Dies, &c.

COLD ROLLED STEEL for Clock Springs, Corsets, &c.
SHEET CAST STEEL for Springs, Saws, Welding and Stamping Cold, &c.
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STEEL.

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Iron Rail and Fastenings,

SPRING STEEL

AND

WIRE OF ALL KINDS,

Tire, Axles and other Forgings,

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Best Warranted Cast Steel for Machinists' Tools,

Taps, Dies, Punches, Shear Blades, Chipping Chisels and Granite Rock Drills,

Extra Mild Center Steel, special for Taps,

ALSO,

MACHINERY AND CAST SPRING STEEL, HEAVY AND LIGHT FORGINGS.

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STEEL

Gautier Steel.

See Page 3.

Steel.

NEWARK STEEL WORKS.

BENJAMIN ATHA & CO.,

Manufacturers of

BEST REFINED CAST STEEL

And grades of Steel specially adapted for Lathe Tools, Chisels and Taps and Dies.

Warranted most superior for TOOLS AND GRANITE ROCK DRILLS.

A full assortment of this universally approved OLD BRAND and other Steels for sale by

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MERCHANT BARS, TIRE AND SHAFTING,

Railroad Iron, Pig Iron, Merchant and Ship Iron

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Manufacturers of all Descriptions of Steel.

Manufacturers of Every Kind of Steel Wire.

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THE

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(SIEMENS' PROCESS,)

MANUFACTURERS OF

Steel Rails,
Steel Blooms for Rails,
Steel Blooms for Wire,
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Steel Boiler Plates,
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Particular attention is paid to quality and temper for FILES, SAWS, EDGE TOOLS, TABLE and POCKET CUTLERY, TOOLS, TAPS and DIES; also for COLD ROLLED STEEL for CLOCK SPRINGS, CORSET CLASPS, &c.

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THE RED JACKET REVOLVER,

Rupertus' Revolvers, Breech-loading Shot Guns and Rifles; Nichols Cutlery Co.'s Table Knives and Forks; Star Cutlery Co.'s Pocket Knives.

Rupertus' Single Breech-Loading Shot Gun, Twist Barrel.

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Horse, Mule & Snow Shoes of the Perkins Pattern.

Works at Valley Falls, R. I., and Buffalo, N. Y. Office, 31 Exchange Place, Providence, R. I.

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R. MUSHET'S Special Steel

FOR

LATHES, PLANERS, &c.

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BLACK LEAD STOPPERS,

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Bessemer Converters and Siemens-Martin Furnace Ladles.

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Black Lead Crucibles, all kinds and sizes.

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Twenty years' practical Experience.

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FIRE BRICK WORKS.

Manufacturers of Clay Retorts, Fire Brick, Gas House and other Tile, Cupola Brick, &c. Dealers in and Miners of Fire Clay and Fire Sand. Clay bank at Burt's Creek, New Jersey. Manufactory: Van Dyke, Elizabeth, Richards and Partition Sts., Brooklyn, N.Y. Office: No. 88 Van Dyke St.

Watson Fire Brick Manufactory,

ESTABLISHED 1856.

JOHN R. WATSON, Perth Amboy, New Jersey.

Manufacturer of

FIRE BRICK,

For Rolling Mills, Blast Furnaces, Foundries, Gas Works, Lime Kilns, Tanneries, Boiler and Grate Setting, Glass Works, &c. Fire Clays, Fire Sand, and Kaolin for Sale.

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Specially for OPEN-HEARTH FURNACES.

More "heats" obtained from them than from any other Bricks known.

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Common Sense Band Cutter,

A Perfect Tool, for Cutting and Removing Twine or Wire Bands from Bundles of Grain Before Threshing.

The only Band Cutter that does not grasp several straws with the band; that is absolutely certain in its operations, and does not fatigue the hand. It will cut, grasp and remove wire, string or paper bands by one single movement. No squeezing, no chafed hands, no blisters, no shears, no slow, hard work, and while threshing it will pay for itself every hour.

EVERY FARMER MUST HAVE ONE

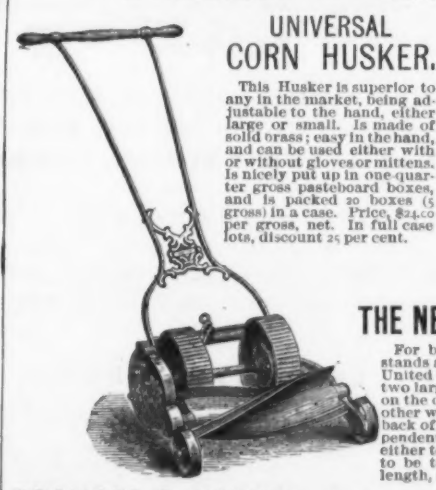
For use with his Self-Binder during the harvest, and when threshing he can save all of the binding material.

Price $3.00 per dozen, net.

Directions.—Push into bundle, pull out, and by the same movement (or swing of the arm) push point lightly against a board standing in a box to discharge the band. The knife being self-adjusting is always in proper position.

[For cutting off the ends of wire, push curved end of knife with thumb, and pull the other end with finger.]

Every one Warranted.



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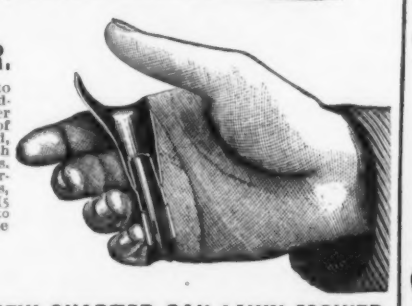
CORN HUSKER.

This Husker is superior to any in the market, being adjustable to the hand, either large or small. Is made of solid brass; easy in the hand, and can be used either with or without gloves or mittens. Is nicely put up in one-quarter gross pasteboard boxes, and is packed 20 boxes (5 gross) in a case. Price, $24.00 per gross, net. In full case lots, discount 25 per cent.



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For beauty, perfection, durability and popularity, "It stands at the head of the list of Lawn Mowers, both in the United States and Europe." The machine is mounted on two large driving wheels or pulleys, and instead of being on the outside of the frame, to run in the uncut grass like other wheel mowers, they are placed inside of the frame back of the cutting blades, running on a shaft each independent of the other, allowing the machine to be turned either to the right or the left without injury to the sod, and to be turned around in a circle no greater than its own length, and cutting at the same time. For prices, address

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(ESTABLISHED 1823.)

HEADQUARTERS FOR SCYTHE, AXE, KNIFE, HACKER AND TOOL STONES.

Twenty Quarries and Four Factories in New Hampshire and Vermont.

Strong, Clear Grit Stone that will not glaze.

PRICES & QUALITY GUARANTEED

All Goods Genuine Brands.

My customers may rely upon being squarely dealt with and getting no poor, unsalable imitations.

LIST

No. 1, Extra Indian Pond.
No. 1, " "
No. 2, " "
Premium.
Union.
White Mountain.
L'étoile.
Diamond Grit.
Hacker (Round).
Lamoille.
Willoughby Lake.
Green Mountain.
Black Diamond.
Ragg.
Mowing Machine.
Paper Mill Stone.
Vermont Darby,
" Chocolate.
" Axe Bitts.
N. H. Chocolate.
German Pattern.

The only Manufacturer of Genuine, Old Reliable Indian Pond (Red End).

Stones manufactured, labeled and branded in any manner desired.

Beware of Coarse Brittle Imitations.

No. LB.

No. 00. No. 10.

VERMONT SNATH CO.,

MANUFACTURERS OF THE

No. 00 and 000 Patent Swing Socket Snaths.

SPRINGFIELD, VERMONT.

No. Z. No. 2.

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Represented in New York by LAMSON & GOODNOW MFG. CO.

The Leading Wringer of America.

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New York Office, *79 Chambers St.*

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Office and Factory,

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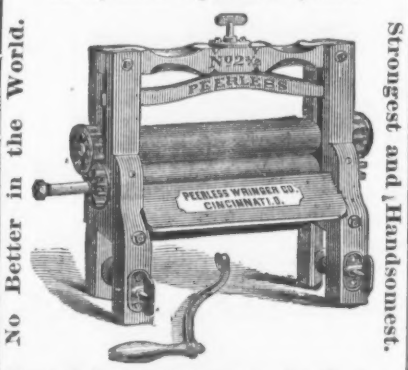
Clothes Wringers,

Sold by the Jobbing Trade everywhere.

No Better in the World. Strongest and Handsomest.



Most Saleable Wringer in the Market.

TRY A SAMPLE ORDER.

The Most Durable and Best Selling

Bucket for Chain Pumps.

It has no valves to become obstructed and no screw joints to become immovable by rust.

Advantages of the Crosby Bucket over all others:

1. It has an air chamber on top, which conducts the air to the bottom of the well.
2. It is self-expansive, the base of the bucket being ¼ of an inch larger at bottom than core in the tubes, which allows it to expand, and the groove in the side to contract.
3. The wear comes on the whole side, and not on the extreme edge like other buckets.
4. It contains more solid rubber than three of any other manufacture.

No charge for territorial rights. Send for Price List. Agents wanted in every county. Address

A. D. CROSBY, Patentee and General Agent,
Cuba, Allegany Co., New York.

HYATT'S PATENT SPRING BOLT.

Patented Jan. 29th, 1878.

For Fastening Cabinet Ware, Closet and House Doors, &c.

We call the attention of the trade to these Wrought Brass and Iron Bolts, as being the best and cheapest in the market. Sizes, two inches and upward, both plain and neck bolts. Two screws fasten the bolt and bed-plate to the wood; no others are required; the bed-plates are made of brass, from which the spring is cut and raised, upon which the bolt slides with an easy, elastic movement, saving expense of screws and producing a strong, handsome and cheap Bolt. Price list furnished on application.

BRASS GOODS MFG. CO.,
43 Chambers St., New York.

We also manufacture all kinds of Brass and Tin Goods, Drop Bases, Thimbles and Roses for Door Knobs, Plate Escutcheons, Brass Labels, Patent Mirror Business Cards, &c.

Southwark Hardware Co.

PHILADELPHIA, PA.,

Manufacturers of

FOUR GRADES OF

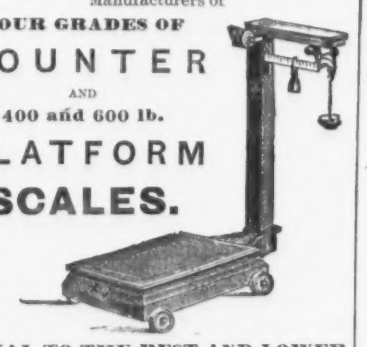
COUNTER

AND

400 and 600 lb.

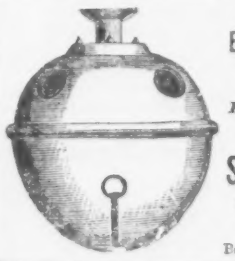
PLATFORM

SCALES.



EQUAL TO THE BEST AND LOWER IN PRICE.

Send for Illustrated Catalogue.



Established 1838

Bevin Bros. Mfg. Co.,

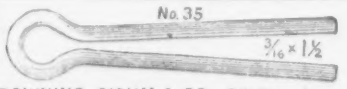
Easthampton, Ct.

Manufacturers of

SLEIGH BELLS,

House, Tea, Hand, Gong Bells, &c.

Bell Metal Kettles.



BROWNING, SISUM & CO., 85 Chambers St.,

Manufacture

Belt Hooks, Cotters, Spring Keys, D Rings, Staples, and everything pertaining to wire bending.

Factory, BROOKLYN.

John T. Lewis & Bros.

No. 231 South Front St., PHILADELPHIA.

JOHN T. LEWIS & BROS. WARRANTED PURE WHITE LEAD. PHILADA.

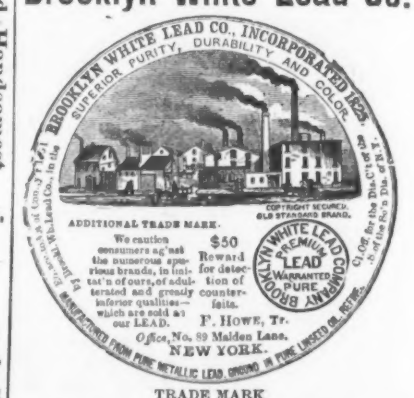
TRADE MARK.

MANUFACTURERS OF

Pure White Lead, Red Lead, Litharge, Orange Mineral, Linseed Oil,

AND PAINTERS' COLORS

Brooklyn White Lead Co.



TRADE MARK

White Lead, Red Lead & Litharge.

No. 182 Front Street, NEW YORK,

JOHN JEWETT & SONS

Manufacturers of the well-known brand of

WHITE LEAD.

JEWETT & SONS' PERFECTLY PURE WHITE LEAD.

TRADE MARK.

ALSO MANUFACTURERS OF

LINSEED OIL.

182 Front Street, NEW YORK.

ATLANTIC WHITE LEAD. PURE. WARRANTED ROBERT COLGATE & CO.

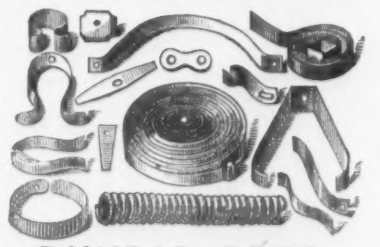
TRADE MARK.

The Atlantic White Lead and Linseed Oil Co.,

MANUFACTURERS OF

White Lead (Atlantic), Red Lead, Litharge & Linseed Oil.

ROBERT COLGATE & CO.,
287 Pearl Street, New York



DUNBAR BROS.,

Manufacturers of

Clock Springs and Small Springs

of every description, from best Cast Steel,

BRISTOL, CONN.

W. & J. TIEBOUT,

Manufacturers of

Brass, Galvanized & Ship Chandlery Hardware,

No. 33 Chambers St., New York.

PIANOS Stool, Cover and Book only $143.75. Organs, 13 Stops, 3 set Reeds, Stool, Book, only $68. Paper free. DAN'L F. BEATTY, Washington, N.J.

PHILADELPHIA.

(Corrected Weekly by Lloyd, Supplee & Walton.)

Terms, 30 days. For 60 or 90 days, interest added at 10 per cent. per annum.

Anvils.
Peter Wrights, ℔ ..... 11c net
Over 250 lbs ..... 11½c net
Eagle (American) ..... 100 ℔—dis 20 %

Apple Parers.
Reading No. 72 ..... per doz $5.00 net
" No. 74 ..... " 6.00 net
" No. 75 ..... " 7.00 net
" No. 76 ..... " 7.50 net
Peach Parers ..... " 15.00 net
Little Favorite, corer and slicer ..... " 7.50 net
Lots of 10 to 25 dozen special price.

Axes.
Hunt's Kentucky and Yankee ..... per doz $11.00
Mann's Red Warrior ..... " 11.00
Richland Chief ..... " 10.00
Beveled Axes ..... add 50c " net
Double Bit Axes ..... net " 22.00

Augers and Auger Bits.—New List January 1.
Bates' Nut Augers ..... dis 40 %
Cook's Augers ..... dis 40&10 %
Watrous' Ship Augers ..... dis 15 %
Benjamin Pierce Auger Bits ..... dis 35 %
Griswold Auger Bits ..... dis 40 %
Cook's " ..... dis 40&10 %
Jennings' " ..... dis 10, 10&10 %
Bonney's Pat. Hol. Augers, list $48 ℔ doz ..... dis 25&10 %
Stearns' Pat. Hol. Augers, list $48 ℔ doz ..... dis 20&10

Balances.
Light and Common ..... dis 15&10 %

Bells.
Bevin Bros. Mfg. Co. Light Hand Bells ..... dis 55&10 %
Swiss Pattern Hand Bells ..... low list dis 30&10 %
Connell's Door Bells ..... dis 25 %
Gt. Western & Kentucky Cow, new list ..... dis 40 %

Bolt and Rivet Clippers.
Chambers' No. 1. for ⅝ bolt ..... each, $7.50 } dis 15 %
" No. 2, " ⅞ " ..... " 9.00 }
" No. 3. " 1⅛ " ..... " 12.00 }

Boring Machines.
Upright, without Augers ..... List 5 50 } dis 33⅓ %
Angular, without Augers ..... " 6.75 }

Bolts.—Eastern Carriage Bolts ..... dis 60 & 5 %
Philadelphia " ..... new list dis 50 %
Stanley, Wrought Shutter ..... dis 45 %

Braces.—Barber's ..... dis 40&5 %
Backus ..... dis 60 %
Spoffard ..... dis 50&5 %
American Ball ..... dis 40&10 %

Butts.—Cast Fast Joint, Narrow ..... dis 10&10 %
" " Broad ..... dis 20&10 %
Cast Loose Joint, Narrow ..... dis 25&10 %
" " Broad ..... dis 25&10 %
" Acorn, Loose Pin ..... dis 25&10 %
" " Jap'd ..... dis 30&10 %
" Mayer's Loose Joint ..... dis 25&10 %
Wrought Loose Pin ..... dis 35&10 %
" Table Hinges and Back Flaps ..... dis 25&10 %
" Narrow, Fast ..... dis 25&10 %
" Loose Joint ..... dis 25&10 %

Blind Butts.
Parker ..... dis 50&10 %
Clark ..... dis 60&10 %
Shepard ..... dis 50 %
Lull & Porter ..... dis 55&10 %
Huffer's ..... dis 35&10 %

Chains.—German Halter and Coil, new list Oct. 22, 1879 ..... dis 20 %
Galvanized Pump ..... ℔ 100 net
Best Proof Coil Chain—English.

℔	13	11½	9¼	8⅛	8	7¾	gold
	3-16	¼	5-16	⅜	7-16	½	in.

Chisels.—Socket Framing ..... dis 55&10 %
Socket Firmer ..... dis 55&10 %
Butcher's ..... $6.00 to £ gold

Casters.—Bed ..... dis 20&10 %
Plate ..... dis 20&10 %

Coffee Mills.—Box and Side, new list Jan. 1, 1880 ..... dis 55 %
Enterprise ..... dis 15 %

Cutlery.—Walden Pocket ..... new list net
Landers, Frary & Clark, J. Russell & Co., Lamson & Goodnow Mfg. Co. and Meriden Cutlery Co., Manufacturers' prices net.

Drawing Knives.
Hart Mfg. Co.'s ..... dis 55&10 %
Adjustable Handle ..... dis 15 %

Fry Pans.
Tinned ..... dis 45 %
℔ doz. $2.50 4.00 4.50 5.00 5.50 6.50 7.50 9.00 10.00
No. 0 1 2 3 4 5 6 7 8
Burnished ..... dis 45 %
℔ doz. $3.00 3.75 4.25 4.75 5.25 6.00 7.00 8.00 9.00
No. 0 1 2 3 4 5 6 7 8

Files.
Nicholson ..... dis 20 %
Disston ..... dis 20 %
Butcher ..... $4.50 £
Spencer ..... $4.50 @ 4.75 £

Fluting Machines.
Eagle—3½ in. roll ..... each, $2.15, dis 10 %
" —5½ in. roll ..... " 2.85 net
Crown—4½ in. roll ..... " 3.50 }
" —6 in. roll ..... " 4.00 } dis 10 %
" —8 in. roll ..... " 6.50 }
Geneva Fluter ..... dis 20 %
Favorite com Fluter & Sad Iron ..... ℔ doz $10.50 net

Hammers.
Yerkes & Plumb's, new list ..... dis 15 %

Hatchets.
Yerkes & Plumb, new list ..... dis 15 %
Hunt ..... dis 15 %

Hinges.
Strap and T ..... dis 25&10 %

Horse Nails.

	Nos.	5	6	7	8	9	10
Ausable		30	27	25	24	23	22
" Pol'ed & P't'd and Blued and Pointed.		31	28	26	25	24	23
Globe ..... New list.		26	23	21	20	19	18
Clinton		22	20	19	18	17	
" Polished & Pointed		23	21	20	19	18	

Porter, all sizes ..... ℔ 100, net
Discount on Ausable and Clinton, 20 %; Globe, 10%

Locks and Knobs.
Branford ..... dis 30&2 %
Gaylord Cabinet ..... dis 10&2 % cash
American Padlocks ..... dis 33⅓&2 % cash
Scandinavian Padlocks ..... dis 50 %
℔ doz. $5.00 5.50 6.50 7.50 8.50 10.00 12.50 } dis 50 %
No. 57 58 59 60 61 62 63 }
℔ doz. $18.00 26.00 33.00 } dis 50 %
No. 64 65 66 }

Lanterns.
Square Candle and Oil ..... ℔ doz
Tubular ..... No. 0, $9.65; No. 1, $11.30 ℔ doz net
Globes, 35 cents extra per doz. net.

Lawn Mowers.—Pennsylvania ..... dis 30&10 %
Philadelphia ..... dis 30&10 %
Excelsior ..... dis 30&10 %

Lawn and Garden Pumps.
Holland Patent ..... List $5.00 dis 10 %

Mattocks.
Long and Short Cutter ..... new list
Pennsylvania Pattern ..... per doz

Molasses Gates.
Enterprise Mfg. Co.'s Measuring Faucets ..... dis 15 %
Stebbins' Gates ..... dis 50&10 %
Lincoln's " ..... dis 50&10 %
Landers, Frary & Clark's Petroleum ..... dis 20&10 %
Brass Liquor Cocks, new list Jan. 1, 1880 ..... dis 25&10 %
Cork Lined " ..... dis 70 %

Meat Cutters.—Pennsylvania Meat Cutter ..... dis 40 %
Dixon's ..... dis 25 %
Woodruff ..... dis 25 %
Stowe ..... dis 25 %
Hale's ..... new list, dis 40, 2&10 cash
American ..... dis 25 %
Stuffers ..... dis 25 %
Enterprise Stuffers ..... dis 15 %

Planes.—Ohio Tool Co ..... dis 25 %
Scioto ..... dis 30 % } 10 % cash
Auburn ..... dis 25 % } in 10 days.
New York Tool Co ..... dis 50 %
Bailey ..... dis 20&10 %

Plane Irons.—Ohio Tool Co ..... dis 10&5 %
Butcher's ..... £, $4.50

Plumbs and Levels.
Stanley's Adjustable ..... dis 60&10 %
" Non-Adjustable ..... dis 60&10 %

Picks.—New list ..... $5.00, dis 10 %
Pumps.—Bickford ..... dis 10 %
Rules.—Stanley Boxwood ..... dis 55&10 %
Stanley Ivory ..... dis 45&10 %

Steelyards.—Hart's Pattern ..... dis 30&10

℔ doz.	$14.40	17.75	21 00	26.50	31 00	35.40
Lbs	50	100	150	200	250	300

American Pattern ..... dis 30&10 %

℔ doz.	$8.00	10.25	13.75	15.60	16.75	19.50
Lbs	50	100	150	200	250	300

Squares.
Steel and Iron ..... dis 40 %; full case, dis 50&10 %
Try Squares, Stanley ..... dis 45&10 %
Disston's Try Squares ..... dis 50 %

Scythes.—Golden Clipper, Damascus Blade, Boxed and Sharpened ..... ℔ doz $9.00 net
Clipper No. 10, Bronzed Blade, Boxed and Sharpened ..... ℔ doz $8.50 net
Clipper No. 5, Painted Red, Boxed and Sharpened ..... ℔ doz $8.00 net

Saws.—Disston's Hand, Panel and Rip ..... dis 20 %
Disston's Circular ..... dis 35 %
" Cross-Cut No. 2, Plain Tooth ..... dis 20%
" Patent Tooth ..... dis 20%
" Champion Tooth ..... dis 20%
Boynton's Lightning Cross Cut, new list ..... dis 20 %
" One Man, all lengths, " ..... dis 20 %
" Billet Webs, 30 inch, " ..... dis 25 %
" Lightning Buck Saws, cross bar ..... dis 25 %
" " Hand, Panel and Rip ..... dis 25 %

Shovels and Spades.
Rowland ..... dis 40 %
Oliver Ames & Sons, new list ..... dis 10 %
Griffith ..... dis 40 %

Sad Irons.—4 to 10 lbs ..... ℔ ℔ 4½c
Mrs. Potts' Patent ..... dis 20 %

Stone.—Arkansas Oil Stone ..... ℔ ℔ $2.00 net
Washita Extra ..... ℔ ℔ 270 net
" No 1 ..... " 180
" No. 2 ..... " 150
" Slips ..... " 360
" Axe ..... " 180 net
Turkey Oil Stone No. 1 ..... ℔ ℔ $1.00 net
Hindostan Oil stone No. 1 ..... ℔ ℔ 6c } dis 30 & 10 %
" Axe Stone ..... " 8c }
" Slips ..... " 100 }

Screws.
Flat Head Iron ..... dis 35 %
" Brass ..... dis 25 %
Round Head Brass ..... dis 10 %
" Iron ..... dis 25 %

Spoons.
Plated ..... dis 33⅓&2&5 %
German Silver ..... dis 25 %
Britannia, Boardman's ..... dis 55 %
" Parker's ..... dis 55 %
Tinned ..... dis 10 %

Springs.—Torrey ..... ℔ doz $2.25 net
Philadelphia ..... 5 in., $4.00; 8 in., $7.00 ℔ doz. dis 25 %
Chatfield No. 1, $2.75; 2, $3.25; 3, $5.00 ℔ doz, dis 33⅓%
Gem Coil No. 1, Large Jap'd ..... ℔ doz $3.50 }
" No. 2, Medium Jap'd ..... " 2.50 } net
" No. 3, Small Jap'd ..... " 2.00 }

Stocks and Dies. ..... dis 10&5 %

Stove Polish.—Gem ..... ℔ gross, $4.50, dis 5 %
Dixon ..... " 5.75 net
Onyx ..... " $4.00 @ 4.25 net

Tacks, Brads, &c. ..... dis 20 %
Shoe Nails—4-8, 9½c; 3½-8, 10c ℔ lb ..... net
Double Pointed Tacks ..... dis 40&5 %

Traps.
Genuine Oneida—Newhouse ..... dis 30 %
Im. Oneida—Newhouse list, first qual ..... dis 45 %

Vises.—Solid Box, Trenton new list ..... dis 25 %

Wrenches.—Agricultural ..... dis 50 %
Coes' Genuine ..... dis 33⅓ %
" " Mechanics' ..... dis 33⅓&10 %
" " Mall. Bar ..... dis 65 %
Philada. Tool Co., Duplex ..... dis 25 %

Wire.
Bright or Ann'd, No. 0 to 18 ..... dis 40 to 42½ %
" No. 19 to 26 ..... dis 50 to 52½ %
" No. 27 to 36 ..... dis 55 to 57½ %
Coppered, 0 to 18 ..... dis 35 to 37½ %
Tinned Broom Wire ..... dis 42½ to 45 %
Galvanized No. 7 to 18 ... Market List, dis 20 to 22½ %

Wringers.
Peerless No. 2 ..... $53.00
" " 2 ..... 66.00
Universal, No. 2 ..... 63.00
" " 2 ..... 66.00
Novelty, No. 1 ..... 63.00
" " 2 ..... 66.00

PITTSBURGH.

Merchant Iron.

TERMS.—Note or acceptance at 60 days, with current rate of exchange on New York, or a discount of 2 per cent. for cash, if remitted within 10 days from date of invoice.

Flat Bar.

1½ to 4 by ⅜ to 1 inch	2.50		
4¼ to 6 by ⅜ to 1 "	2.60		
1¾ to 6 by 1⅛ to 1¼ "	2.90		
1¼ and 1⅜ by ⅜ to ¾ "	2.60		
1 and 1¼ by ⅜ to ¾ "	2.70		
⅝, ¾ and ⅞ by ⅜ to ⅝ inch	2.90		
Rounds and Squares.			
1 to 1⅜	2.50	⅝ to 9-16	2.70
2 to 2⅛	2.70	½ to 7-16	2.90
2⅛ to 2¼	3.00	⅜	3.10
2⅜ to 4	3.50	5-16	3.30
4¼ to 5	4.00	¼	3.50
¾ to ⅞	2.60	3-16	5.50
Oval Iron.			
⅞ to 1⅜	2.90	⅛	3.30
⅝ to ¾	3.10	⅜	3.70
Half Oval and Half Round.			
⅞ to 1¼ inch	3.20	⅛ inch	4.00
⅝ to ¾ "	3.70	⅜ "	5.50
Horse Shoe.			
⅝ to 1⅜ by 5-16 to ⅜ inch	3.50		
Wagon Box Iron.			
¾ Inch, Nos. 13 and 14	3.70		
⅞ " " 11 and 12	3.50		
¾ " " 13 and 14	4.00		
¾ " " 11 and 12	3.80		
⅞ " " 13 and 14	4.40		
⅞ " " 11 and 12	4.10		
Heavy Bands.			
3½ to 6 by ¼ and 5-16 inch	3.7		
1⅜ to 3¼ by ¼ and 5-15 "	2.7		
1 to 1⅜ by ¼ and 5-16 "	2.8		
¾ to ⅞ by ¼ and 5-16 "	3.0		
⅝ and ⅜ by ¾ and 5-16 "	3.5		
Light Bands.			
1½ to 6 by ⅛ to 3-16	3.0		
1⅜ to 6 by Nos. 11 and 12	3.1		
1 to 1⅜ by ⅛ to 3-16	3.1		
1 to 1⅜ by Nos. 11 and 12	3.2		
⅝ and 13-16 by ⅛ to 3-16	3.4		
⅝ and 13-16 by Nos. 11 and 12	3.5		
½ and 11-16 by ⅛ to 3-16	3.7		
½ and 11-16 by Nos. 11 and 12	3.8		
⅜ and 9-16 by ⅛ to 3 16	4.0		
⅜ and 9-16 by Nos. 11 and 12	4.1		
⅛ inch by ⅛ and 3-16	4.3		
⅛ inch by Nos. 11 and 12	4.4		
Hoop Iron.			
1¼ to 4, Nos. 13, 14 and 15	3.3		
1¼ to 2, Nos. 16, 17 and 18	3.4		
1¼ to 2, No. 19	3.5		
1¼ to 2, No. 20	3.6		
1¼ to 2, No. 21	3.7		
1¼ to 2, No. 22	3.8		
15-16, 1, and 1⅛, Nos. 13, 14 and 15	3.5		
15-16, 1, and 1⅛, Nos. 16, 17 and 18	3.6		
15-16, 1, and 1⅛, Nos. 19 and 20	3.7		
15-16, 1, and 1⅛, No. 21	3.8		
15-16, 1, and 1⅛, No. 22	3.9		
⅞, Nos. 13, 14 and 15	3.7		
⅞, Nos. 16, 17 and 18	3.8		
⅞, Nos. 19 and 20	3.9		
⅞, No. 21	4.0		
⅞, No. 22	4.1		
13-16, Nos. 13, 14 and 15	3.9		
13-16, Nos. 16, 17 and 18	4.0		
13-16, Nos. 19 and 20	4.1c		
13-16, No. 21	4.2c		
13-16, No. 22	4.3c		
¾, Nos. 13, 14 and 15	4.0c		
¾, Nos. 16, 17 and 18	4.1c		
¾, Nos. 19 and 20	4.2c		
¾, No. 21	4.3c		
¾, No. 22	4 4c		
11-16, Nos. 13, 14 and 15	4.2c		
11-16, Nos. 16, 17 and 18	4.3c		
11-16, Nos. 19 and 20	4.4c		
11-16, No. 21	4.5c		
11-16, No. 22	4 6c		
⅝, Nos. 13, 14 and 15	4 4c		
⅝, Nos. 16, 17 and 18	4.5c		
⅝, Nos. 19 and 20	4.6c		
⅝, No. 21	4.6c		
⅝, No. 22	4.8c		
⅝, No. 23	4.9c		
9-16, Nos. 13, 14 and 15	4.6c		
9-16, Nos. 16, 17 and 18	4.7c		
9-16, Nos. 19 and 20	4.8c		
9-16, No. 21	4.9c		
9-16, No. 22	5.0c		
9-16, No. 23	5.1c		
½ inch, Nos. 13, 14 and 15	4.8c		
½ " Nos. 16, 17 and 18	4.9c		
½ " Nos. 19 and 20	5.1c		
½ " No. 21	5.2c		
½ " No. 22	5.3c		
½ " No. 23	5.4c		

The prices under Hoop Iron do not apply to Cotton Ties.

1-10c per lb. extra will be charged for each gauge lighter than the lightest indicated.

1-10c per lb. extra will be charged for cutting Hoops to specified lengths.

Barrel Hoops.

1¼ to 2 in., cut to length.

9 to 11 lbs. per set of 6 hoops 2.5c
8 lbs. and less than 9 lbs. per set of 6 hoops 3.0c
Less than 8 lbs. per set of 6 hoops 3.8c

Extras for Cutting to Length all Preceding Iron.

All Iron, including Tire 1.10c

Tank Iron.

No. 9 and heavier 3.3c
Flow Slabs 3.5c
" Wings 3.8c

Sheet Iron.

	Common.	Charcoal.	Juniata.
No. 10 to 14	3.5c	5.0c	6.5c
No. 15 to 17	3.8c	5.1c	6.8c
No. 18 to 21	4.1c	5.6c	7.1c
No. 22 to 24	4.3c	5.8c	7.3c
No. 25 & 26	4.5c	6.0c	7.5c
No. 27	4.7c	6.2c	7.7c
No. 28	5.1c	6.6c	8.1c

All sheets No. 18 and lighter, over 30 inches wide, not less than 2.10c extra.

Wood's Patent Planished Sheet.

1st quality (A) ..... 13c | 2d quality (B) 11½c

Galvanized Iron—Juniata.

Nos. 14 to 20	12c	No. 27	15c
Nos. 21 to 24	13c	No. 28	16c
Nos. 25 and 26	14c	No. 29	18c

Current discount to jobbers, 1st quality, 27½ %; 2d quality, 37½ %.

Coal Screen Iron.

4¾ by ⅝ by 5-16 ..... 2.0c | 1 by ⅝ by 5-16 ..... 3.5c

Angle Iron.

2½, 3, 3½ and 4 inch 3.3c
1½, 1¾, 2 and 2¼ inch 3.3c
1¼ inch 3.4c
1 " 3.0c
1¼ by 1 inch, for Plow Handles 3.8c
1¼ by ¼ " " " 3.8c
1⅜ by ¾ " " " 3.9c

T Rail.

8 lbs. to the yard ..... 2.9c | 20 lbs. to the yard 2.9c
12 " " ..... 2.9c | 28 " " 2.9c
16 " " ..... 2.9c | 40 " " 2.9c

Splice Joints for 12, 16 and 20-lb. Rail, 4cc each; 28 and 30-lb. Rail, 5cc each; 40 lb., 6cc each.
3¼ by ⅝ and ½ Spikes for 20 and 28-lb. Rail 4½c
2½ and 3 by ⅝ " " 12 and 16-lb. " 4¾c
2½ by 5-16 " " 8-lb. Rail 5¼c

Flat Rails.—Punched and Countersunk.

1¼ to 2 by ¼ to ⅝ inch 3.0c
1½ by ⅜ and 7-16 inch 3.2c
1¾ by ⅞, 7-16 and ½ inch 3.5c

Juniata Nail Rods 6.5c
Norway " 8.0c
Guard Iron, 7-16x¾x16 and ½x⅝x16 ..... 4.0c
" ⅝x⅞x20-16 and ⅝x⅞x14 ..... 4.2c
Drag Bars 3.3c
Dropper Bars 3.8c
Cylinder and Landside Iron 3.2c
Plow Beam Iron 3.0c

Nails.
10d to 60d $3.25

Best Quality Refined Cast Steel.
Square, Flat, Octagon and Round.

⅜ to 2 inches, inclusive 13½c
5-16 and 2½ to 3 inches 14½c
¼ and 3¼ to 4 " 15½c
7-32 and 4¼ to 5 " 16½c
3-16 and 5¼ to 6 " 17c
5-32 inch 23½c
⅛ inch 31½c
Cut to multiples or specified lengths, ½c extra.
Oil Well Steel Forgings 21½c
No grade of Crucible Tool Steel shall be sold for less than above prices.

Machinery Steel.

Ordinary Sizes, ⅜ to 2 inch	Crucible.	Bessemer & Open Hearth.
Round	8½c	7c
5-16 and 2½ to 3 inches	9½c	8c
¼ and 3¼ to 6 "	10½c	9c
7-32 inch	11½c	10c
3-16 "	13½c	12c

Square, Flat and Octagon, ½c extra throughout the list.
Cut to multiples or specified lengths, ½c extra.

Hammer Cast Steel.

2 inches and under 9c
Above 2 inches 10c

Sheet Steel.—Crucible.

	Best.	2d Qual.	3d Qual.	Bessemer & Open Hearth.
To 21 gauge	13½c	11½c	9½c	7c

1c. extra for each additional gauge.
Cut to multiples or specified lengths, ½c. extra.

Miscellaneous Cast Steel.

Auger and Auger Bit 9c
Axle Steel for carriages and wagons 9c
Locomotive and Car Axles, Forged 10½c
Frog Points and Plates 11c
" Side Bars 9½c
Pick, plain 9½c
" and Mattock, beveled 9½c
Skate Steel 9c
Table Cutlery 9c
Pike and Cant Hook 9½c
Coal and Granite Wedge 9½c
Roller 8½c
Spindle, subject to Machinery classification 9c
Trap Spring Steel 10c
Forged Crank Pins and Lathe Spindles 12½c
Piston Rods, plain 10c
" forged to shapes 12½c
Slide Bars, plain 9c
" forged to shapes 12½c

Crucible, Open Hearth or Bessemer.

Boiler, Fire-Box and Flue Sheets, not less than 3-16 thick ..... 7½c to 8c
Boiler, Fire-Box and Flue Sheets, not less than ⅛ thick ..... 8½c to 9c
Circulars and semi-circulars, when ordered separately ..... 9½c to 10c
Smoke Stack, to shape ..... 9½c to 11c
Locomotive Tank Steel 7½c

File Cast Steel.

Square, Round, Half Round and Flat Bastard, 8-inch and over 9c
Mill Saw, 8-inch and over 9½c
Taper, 3½-inch and over 11c
Horse and Shoe Rasp 9½c

Spring Cast Steel.

1 to 4x¼ to ⅛ inch 8c
⅛ to 3x5-32 to 3-10 inch 9c
¾ to 3x10 g. to 20 g ..... "
⅜ to ⅝x10 g. to 20 g ..... "
Cut to multiples or specified lengths, ½ cent per lb. extra.
Spiral and Taper, cut to lengths 8½c

Tire Cast Steel.

1x¼ and over 8c
1x3-16, ⅞x3-16 and ¼ 8½c
1 and 13-16x⅛ and 5-32, ⅞x3-16 and 5-32 ..... 9c
¾ and ⅝x⅛ and 3-32 and 12 g 9½c
Solid Safe Cast Steel 8c

Agricultural Implement Cast Steel.

Fork and Rake, Crucible 9c
Horse Rake Steel, cut to lengths, Crucible 9½c
Hoe, Crucible 8½c
Corn Stalk Cutter, beveled 9½c
Beveled Hoe and Shovel Steel in Bars 9½c
Crucible Plow Steel in slabs 9c

Bessemer and Open Hearth.

Spring 6½c
Tire, 3-16 thick and above 6½c
Toe Calk 6½c
Plow 6½c
Axles 6c
Sleigh Shoe 6c
Cutter Shoe, cut to lengths and tapered 7c
Scythe Back Steel 6½c
Grain Drill Bars 9c
" Points 10c
Rolling Coulter Blanks, cut and punched 11c
Thrasher Steel 6c
" Teeth 7c
Rolled Hammer Billets 6½c

Where Bessemer or Open-hearth Steel can be used in place of Crucible, the difference in price shall not be greater than 1c. per lb., except where especially provided in the list.

Terms.—Four months; 3 per cent. discount for cash, if remitted within 30 days.

Rolls and Castings.

Furnace, Floor and Straightening Plates 2½c
Housings and Castings not otherwise specified ..... 3 c
Guide Plates 3½c
Spindles and coupling boxes ..... 3 c
Sand Rolls and Pinions, large size ..... 3 c
" " small size 3½c
Pipe Mill Castings ..... 5 c
Rolling Mill Castings under 50 lbs ..... 4 c
Spur and Bevel Wheels, large 3½c
" " small 4½c
Pulleys up to 30 inches 4½c
" over 30 inches 4½c
Engine Castings, light 4½c
" " heavy ..... 4 c

Chilled Rolls.

6 to 7 in. diam., 7 to 20 in. long 8½c
8 to 15 in. " 8 to 40 in. " 8½c
25 to 24 in. " 15 to 72 in. " ..... 5 c
14 to 31 in. " 72 to 108 in. " ..... 5 c

White and Red Lead.

Strictly Pure White Lead in Oil, in kegs, in lots of 500 ℔ and over, 9c; less than 500 ℔, 9½c in 25 and 50 ℔ Tin Pails, 50c. ℔ ℔ over keg price; 12½ ℔ Tin Pails, 1c ℔ ℔ over keg price; assorted, 1 to 5 ℔, 100 ℔ Cases, 12c.
Dry White Lead, less than 500 lbs., 8¾c; over 500 lbs. 8¼c
Orange Mineral, genuine, in kegs, 10c; in barrels, 9 c
Red Lead, very brilliant, " 8c; " 7½c
Litharge (Potter's Lead) " 8c; " 7½c
Freights equalized with all points.
Terms: Note at sixty days, or if paid within 15 days from date of invoice, a discount of 1½ per cent. will be allowed, but not otherwise.

Window Glass.

Per Box of 50 Feet.—Discount 50&10 % on single strength, 60&10 % on double.

Single Strength.

Size.	AA.	A.	B.	C.
6 x 8 to 10 x 15	$8.25	$7.50	$7.00	$6.50
11 x 14 to 16 x 24	9.25	8.50	8.00	7.25
18 x 22 to 20 x 30	10.75	9.75	8.75	7.75
11 x 36 to 24 x 30	12.25	10.75	9.00	8.50
26 x 28 to 24 x 36	13.00	11.50	9.75	9.00
26 x 36 to 26 x 44	14.50	13.25	10.75	9.50
26 x 46 to 30 x 50	15.00	14.00	11.25	10.50
30 x 52 to 30 x 54	16.00	14 50	12.00	
30 x 56 to 34 x 56	17.25	15.50	13.50	
34 x 58 to 34 x 60	18.25	17.25	15.00	
36 x 60 to 40 x 60	20.75	18.75	17.25	

Double Strength.

6 x 8 to 10 x 15	12.75	11.75	10.75	10.00
11 x 14 to 16 x 24	14.50	13.25	12.50	11.25
18 x 22 to 20 x 30	17.25	15.75	14.00	
15 x 36 to 24 x 30	19.75	17.25	14.50	
26 x 28 to 24 x 36	21.00	18.50	15.75	
26 x 36 to 26 x 44	23.25	21.25	17.25	
26 x 46 to 30 x 50	24.00	22.50	18.00	
30 x 52 to 30 x 54	25.75	23.25	19.25	
30 x 56 to 34 x 56	27.75	25.00	21.75	
34 x 58 to 34 x 60	29.25	27.75	24.00	
36 x 60 to 40 x 60	33.25	30.00	27.75	

An additional 10 per cent. will be charged for all glass more than 40 inches wide. All sizes above 52 inches in length and not making more than 81 united inches, will be charged in the 81 united inches bracket.

BEECHER & PECK,

Successors to Milo Peck, Manufacturers of

PECKS DROP PRESS

11 Regular Sizes. Hammers from 50 lbs. to 2500 lbs.

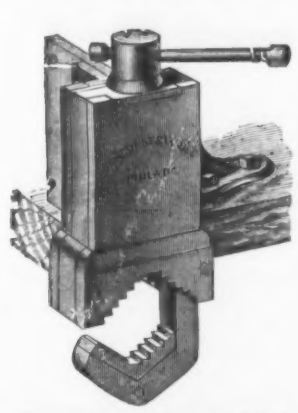
WE HAVE A LARGE STOCK OF SPECIAL DROP PATTERNS.

Special attention given to the making of all Drop Dies.

Special Machinery fitted up to order.

Send for Price List. New Haven, Conn.

IMPROVED PIPE-FITTERS' VISE.

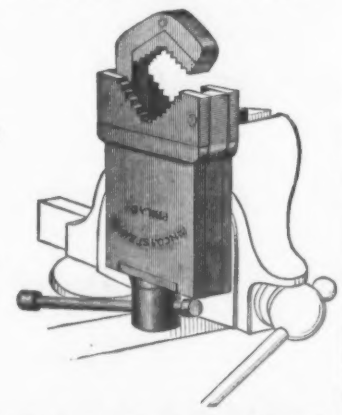


STRONG,

LIGHT,

EFFICIENT,

CHEAP.



To meet the requirements of the large number of persons who have use for such an article, we invite attention to our Improved Pipe Vise. This Vise can be used either as a permanent fixture to work-bench, attached to angle plate or can (unlike others) be held between the jaws of any Machinist's or Blacksmith's Vise; the movable jaw being OPEN ON SIDE permits work to be gripped at any desired point without slipping it in from end, and allows of FITTINGS BEING HELD securely; the Box is made of Malleable Iron, the Screw of Wrought Iron, and the remainder of Solid Steel throughout. The Steel Gripping Jaws can be duplicated and replaced at any time when worn out. It is a very convenient tool, well adapted to the wants of Plumbers, Pump Fitters, Well-Drivers, and all who have use for a tool that is *strong, light, efficient and cheap* which can be readily carried about with kit of tools.

MANUFACTURED BY

PANCOAST & MAULE,

243 and 245 South Third Street, Philadelphia.

Wheeler, Madden & Clemson

MFG. CO.,

MIDDLETOWN, - - - - NEW YORK.

Manufacturers of

WARRANTED CAST STEEL

SAWS

Of every description, including

Circular, Shingle, Cross-Cut, Mill, Hand,

WOOD SAWS, Etc., Etc.

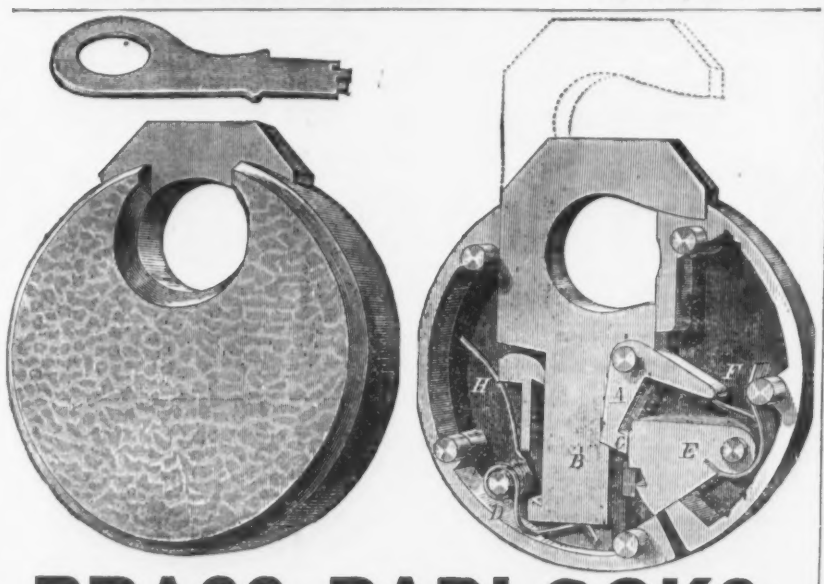
AMERICAN SAW CO.,

Manufacturers of

Movable Toothed Circular Saws,

PERFORATED CROSS-CUT SAWS

And SOLID SAWS of all kinds. Trenton, N. J.



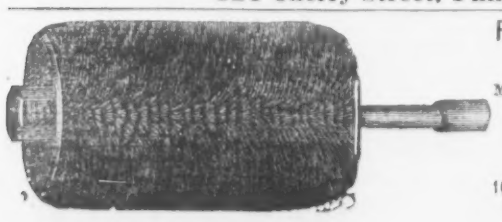
BRASS PADLOCKS.

GREATLY IMPROVED.

For simplicity, compactness, durability, convenience and security they have no equal. Appreciated by all who use them. The best and most economical Padlock for all uses extant. Springs now made of the celebrated Phosphor-Bronze. We make these Locks with Master Keys when so ordered. Largely used by the U. S. Government, Railroads, Corporations, &c.

D. K. MILLER LOCK CO.,

821 Cherry Street, Philadelphia.



PATENT STEEL TUBE AND FLUE BRUSH.

Manufactured and for sale in the

L. B. Flanders Machine Works,

1025 Hamilton St., - - - PHILADELPHIA.

Descriptive circular on application.

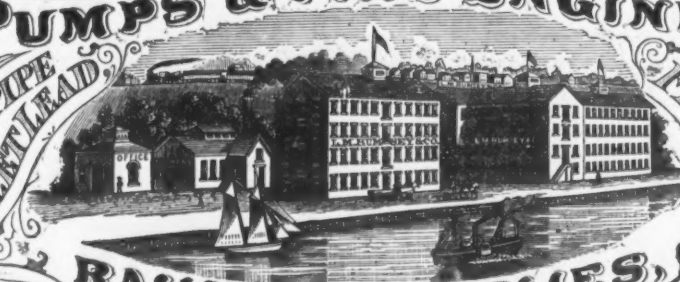
L. M. RUMSEY & CO.

MANUFACTURERS & JOBBERS OF

PUMPS & FIRE ENGINES,

LEAD PIPE & SHEET LEAD

GAS PIPE FITTINGS



RAILWAY SUPPLIES,

PLUMBERS & STEAM FITTERS BRASS GOODS,

NO. 810. N. SECOND STREET, ST. LOUIS, MO.

BELTING, HOSE, PACKING &c.

Manufacturers of GALVANIZED PUMP CHAIN FOR CHAIN PUMPS.

PATENT

Expanding, Self-Draining

RUBBER BUCKET.

Manufactured only by

L. M. RUMSEY & CO.

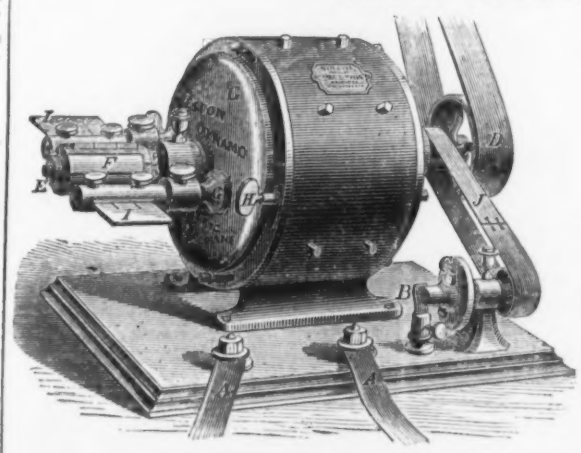
WESTON DYNAMO-ELECTRIC MACHINE CO.

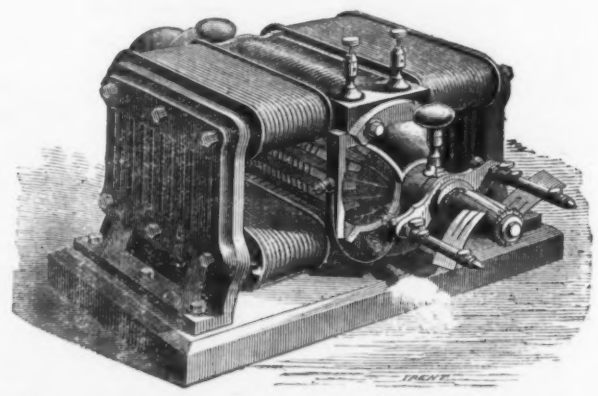
296 Washington Street, Newark, N. J., U. S. A.,

N. E. Weston Electric Light Co., 10 Herald Building, Boston, Mass.,

MANUFACTURERS OF

Machines for Electric Light, Electrotyping and Electro-Plating.





ARE MAKING

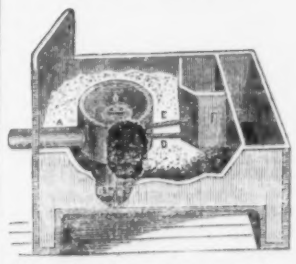
THE MOST POWERFUL, SIMPLE AND COMPACT ELECTRIC LIGHT MACHINE IN THE WORLD.

By actual tests this machine has been found to yield more than double the amount of light per horse-power obtained from the best machines built in this country.

Please send full particulars regarding buildings or localities to be lighted, available power, &c.

Centennial Gold Medal American Institute, 1876. Medal of Superiority, American Institute, 1877. Centennial Medal, Philadelphia, 1876. Paris Medal, 1878.

BAYLISS' HOT BLAST WATER TUYERE AND FORGE.



The side of the forge is broken away to show the construction of the TUYERE.

This Tuyere can be placed in any Forge, with or without water.

This Tuyere has been in use for the past ten years, has stood the test, and exceeds by far any made at the present time.

These Tuyeres and Forges have obtained for the last ten years the first premium, the medals of special award and superiority and diplomas of maintained superiority at the American Institute Fairs.

I respectfully refer to the following order:

MR. JOHN BAYLISS:

Dear Sir:—Please send us at once Ten Tuyeres, small size.

BREWSTER & Co., of Broome st., Broadway, 47th to 48th sts., N. York.

These Tuyeres are used exclusively in the above establishment.

THE Hurricane Bellows

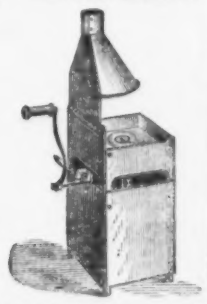
A 30-inch Bellows, No. 4, is equal to a 40-inch pear-shaped Bellows, and a boy of 5 years can work them.

Copy of the Judges' Report in Department V, Group 2, at the 45th Exhibition of the American Institute, held in the City of New York, October, 1876. No. 661.—Blacksmith's Triple Action Cylindrical Bellows.

John Bayliss, No. 147 East 54th st., New York. That a comparison and an actual test of the above named bellows in competition with the Fan Blowers exhibited in the same group convinces your judges that for Blacksmith's use the bellows is not only far superior to the hand blowers exhibited and designed to be used for the same purpose, but that it is superior also to bellows heretofore used. We regard it as a decided advance in the art, and unanimously recommend it for the highest award consistent with the rules adopted by your board for such exhibits.

Silver Medal Awarded.

THE "LITTLE GIANT."



Portable Forge and Bellows.

They are especially adapted for Railroads, Ship, Steam Boiler, Carriage, Bridge Building, Horse Shoers, Jewelers, Pipe Fitting and Locksmiths.

There are three sizes, the cut representing the smallest size.

No. 2 will heat to a welding heat a 2½ inch square bar in 12 minutes, and do any work up to 2½ inches square iron equal to any forge of larger size.

Send for Circulars and Price List.

JOHN BAYLISS, Patentee and Manufacturer,

159 East 54th St., New York.

CASTLE

Hose Reel

AND

Carriage.

Pat. Mar. 19, 1878.

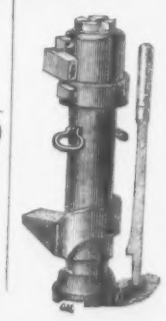
The best device ye invented for handling small hose.

The only adjustable Reel in the market. Four sizes. Send for price list and discounts.

Castle Hose Reel Company,

Cleveland, Ohio.

LYON'S HAND OR POWER PUNCHES AND SHEARS,



For Round, Flat or Square Iron,

ALSO,

Polishing & Buffing Machinery,

HYDRAULIC JACKS,

To raise from 2 to 120 tons.

HYDRAULIC PRESSES,

For special and general use.

HYDRAULIC HAND & POWER PUMPS

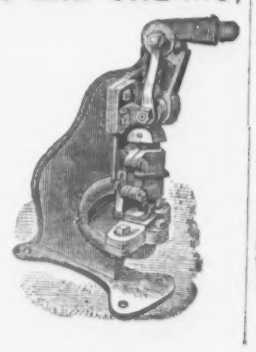
with 1 to 6 plungers, to run hydraulic presses, with either uniform or changeable speed.

Second-Hand Presses.

E. LYON & CO.,

470 Grand Street, - NEW YORK,

Send for circular of what you want.



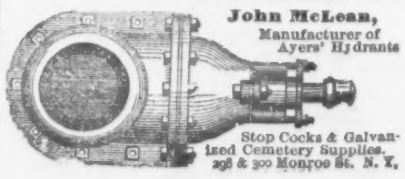
SELF-LUBRICATING

LOOSE PULLEYS

W. OESTERLINE,

No. 13 Home St., CINCINNATI, OHIO.

Send for Circulars and Price List.



John McLean,

Manufacturer of Ayers' Hydrants

Stop Cocks & Galvanized Cemetery Supplies.

298 & 300 Monroe St. N. Y.

BOSTON.

Reported by Macomber, Bigelow & Dowse, 156 to 164 Oliver St.

Anvils.—"Eagle American".....₩ ℔ 05½c. dis 20 %
Apple Parers.—Reading Turn Table.....₩ doz $4.00
Goodell Turn Table..... " 5.40
" Improved Turn Table & Push-off " 7.50
" Lightning..... " 6.40
Hudson's Turn Table and Push-off..... " 6.50
Aiken's Tools.....dis 40&10 %
Anvil & Vise.—
No. 1, $6.25; 2, 4.25; 3, 3.00 each.....dis 25 %
Augurs & Bitts.—Snell's Auger.....dis 40 %
L'Hommedieu's Shin Augers.....dis 15 %
Jenning's Bitts.....dis 10&10 %
Cook's Bitts.....dis 40&10 %
Stearns Hollow Augers.....No. 5 ₩ doz. $48.00
Shepardson's Double-Cut Bitts.....dis 45 %
" " Gimlets.....dis 40 %
Stearn's Extension Hollow Augers.....per doz $39.00
Bonney's " " " .....per doz 30.00
Pierce's Bitts.....dis 35 %
Griswold " .....dis 40 %
Axes.—Blue Jackets.....per doz 11.00
Red Cross.....per doz 10.00
" Handled.....per doz 11.00
Dowse " Boys'.....dis 30 %
Ax Handles.—
Oak Extra, 31 in., No. A.....₩ doz $2.00
" 34 in., No. A.....₩ doz 2.25
" 31 in., No. B.....₩ doz 1.50
" 34 in., No. B.....₩ doz 2.75
" 31 or 34 in., No. C.....₩ doz 1.00
Axle Clips.....dis 50 %
Balances.—Chatillon's.....dis 15&10 %
Barn Door Rail.—
Cast Angle (for Anti-Friction Hangers).....per ft. 4c
" Half-Round.....per ft, ⅝, 6¾c; ¾, 8c
Wrought " .....per ft, ½, 6c; ⅝, 7c; ¾, 8½c
Bells.—Connel's Crank Gong.....dis 30&10 %
Bird Cages.
Japanned M. B. & D., reduced list, 1879.....dis 33⅓ %
Brass " " 1879.....dis 25 %
Blind Fasts.—Lock Fasts.....₩ C sets $6.00
No. 6 Fasts.....₩ C sets 6.50
Veazie Fasts.....₩ C sets 6.50
Shedd's.....₩ C sets 7.00
Blind Hinges.—Mall. Hook, 3 holes.....₩ C sets 8.50
Brad Awl Handles.—
Phœnix Adjustable.....₩ doz $2.00
Bolts.—Norway Iron Carriage.....dis 60 %
Common " .....dis 60&10 %
Borax.—Refined.....₩ ℔ 12½c
Boring Machines.—Eagle Upright.....each, $3.25
Eagle Angle.....each, 4.00
Snell Augers.....₩ set 2.70
Braces.—Barber's.....dis 40 %
Spofford's.....dis 50 %
Backus'.....dis 40 & 10 %
Bracket Saws.—Holly Scroll Saw.....each, $2.50
Demas Lathe and Scroll Saw..... " 6.50
Bracket Saws, extra quality, to No. 6.....₩ gro $0.75
Steel Frame, with patterns.....₩ doz 6.50
Lester.....dis 20 %
New Rogers, all iron.....dis 25 %
Bracket Saw Blades.
Griffith's patent.....₩ gross 75c
Brackets.—M. H. & B. Flower Pot.....dis 35&10 %
Bronzed Shelf, M. H. & B. new list.....dis 40 %
Store Shelf.....dis 40 %
Bronze Hardware.—.....dis 30%
Butts.—Union Fast Joint.....dis 10&10 %
" Loose " .....dis 25&10 %
" Japanned Acorn.....dis 30&10 %
" Silvered " .....dis 50&10 %
" Boston Finish.....dis 60&10 %
Union Spiral Spring.....dis 25 %
Wrought Brass.....dis 30 %
Carriage Bolts.—Eagle Norway.....dis 60 %
Common.....dis 60&10 %
Carriage Jacks.
"Climax," No. 1.....₩ doz $20.00
" No. 1½ " 15.00
" No. 2 " 13.50
"Universal".....dis 25 %
" No. 1.....each, $2.00
" No. 2..... " 3.00
" No. 3..... " 5.00
" No. 4..... " 6.00
" No. 5..... " 6.90
Cartridges.—U. S. Cartridge Co.....dis 50&10 %
Cards.—Watson's makeHorse and Curry.....dis 10%
" Cotton.....dis 10 %
" Wool.....dis 10 %
Casters.—Bed and Table.....dis 15&10 %
Chain.—Traces 6½, 10, 4, streight.....₩ pair 58c
" 6½, 10, 4, twisted.....₩ pair 60c
" 7, 12, 2, " .....₩ pair 84c
Coil 3-16.....₩ ℔ 11 c
" ¼.....₩ ℔ 8½c
" 5-16.....₩ ℔ 8 c
" ⅜.....₩ ℔ 7½c
" 7-16.....₩ ℔ 6½c
" ½.....₩ ℔ 6½c
Chalk.—White, Carpenter's.....₩ gross 60c
Red, Carpenter's.....₩ gross 80c
Blue " .....₩ gross $1.00
Chisels.—Hart, Bliven & Mead, Framing.....dis 55 %
Underhill, Framing.....dis 20 %
Buck's Shank, Framing.....dis 50 %
Clothes Line.—
Galvanized Wire, 100 feet each.....₩ doz $4.50
Coat Hods.—"Dover."—Galvanized, new list.dis 40 %
Japanned, new list.....dis 40 %
Coffee Mills.—New list.....dis 35 %
Copper Rivets.....dis 25 %
Cocks.—Brass, L. F. & C.....dis 25&10 %
Cordage.—Manila, usual trade dis 10.....₩ ℔ 14½c
Jute.....₩ ℔ 11c
Cow Ties......dis 25 %
No. 30, 3 ft. No. 6 Wire, with toggle.....₩ doz $3.00
No. 35, 3 ft. " " with snap.....₩ doz 3.80
No. 40, 3½ ft. " " with toggle.....₩ doz 3.90
No. 45, 3½ ft " " with snap.....₩ doz 4.10
No. 50, 4 ft. No. 4 " with toggle.....₩ doz 4.50
No. 55, 4 ft. " " with snap.....₩ doz 4.75
No. 60, 4½ ft. " 3 " with toggle.....₩ doz 5.38
No. 65, 4½ ft " " with snap.....₩ doz 5.62
Crow-Bars.—Cast Steel.....₩ ℔ 6c
Iron, Steel Pointed.....₩ ℔ 6c

Cutlery.—Pocket, American Shear Co.'s.....dis 40 %
Butcher Knives, "Woods," Lap Bolster, Square Handle.....dis 20 %
Steak Knives.....dis 15 %
Lap Bolster, Oval Handle.....dis 10 %
Sticking.....dis 20 %
Skinning.....dis 20 %
Butcher, Common Round Handle, "Woods".....dis 20 %
Shoe Knives, "Woods".....dis 10 %
Dividers.—Cook's.....dis 25 %
Dog Collars.....dis 20 %
Dog Muzzles.—Automatic.....dis 15 %
Door Springs.—Torrey's Rod.....₩ doz $3.00
Imitation Torrey's Rod.....₩ doz $2.25
Gem Coil.....net list
Crown.....₩ doz $1.50
Warners.....₩ doz $2.00
Door Stops.—"Thurston's".....dis 15 %
Drawer Knobs.—"Thurston's".....dis 45 %
Drills.—Morse Bitt Stock.....dis 25 %
Morse Straight Shank.....dis 20 %
Emery.—Wellington Mills.....₩ ℔ 10c
The Alden Emery Co.....₩ ℔ 6c
Turkish in 10 ℔ cans.....₩ ℔ 8c
Enamelled Ware.
Standard Mfg. Co. Ketties.....dis 40 %
" Sauce Pans.....dis 25 %
Felloe Plates.—Wrought.....₩ ℔ 9c
Files.
American File Co.....dis 25 %
Nicholson " .....dis 20 %
Fluting Machines.
Knox list, $1.00.....dis 10 %
American list, $2.40.....dis 10 %
Forks. W. C. & Co., Manure.....dis 40 %
Gimlet Bitts.
Genuine German, No. 125, 1-32 to 8-32, per doz $1.00
Pierce's.....per doz 58c
Glass Cutters.
Combination Glass Cutter and Knife Sharpener.....₩ doz $1.00
Grub Hoes.—K. P. & Co.'s No. 2, 11.50 ₩ doz. dis 30 %
Hammers.—Maydole's.....dis 15 %
Hammond's.....(new list.)..... dis 20 %
Hangers & Rollers.—Anti-Friction.....dis 40&10 %
Acme Rollers.....dis 40 %
Climax.....dis 40 %
Common Hangers.....dis 50&10 %
" Rollers.....dis 15&10 %
Hand Screws......dis 10 %
Hatchets.—C. F. Dowse new list.....dis 30 %
Underhill.....dis 20 %
Hay Knives.—Lightning.....₩ doz $18.00 net
Fisher's Patent.....₩ doz @14.00
Hinges.—Strap and T (new list).....dis 25&10 %
Providence Plate.....₩ ℔ 6½c
Wrought Screw Hook.....₩ ℔ 6½c
Hoes.—W. C. & Co.'s.....dis 40 %
Hooks and Staples.—Brewers'.....dis 40 %
Horse Nails. No. 6 7 8 9
National Finished..... .23 .21 .20 .19....dis 20 %
Putnam Pointed..... .26 .24 .23 .22.....10 %
Horse Nails.—Bridgewater.....dis 25 %
No. 6 24; No. 7, 21, No. 8, 20; No. 9, 19.
Ice Cream Freezers.—"Packer's".....dis 33⅓ %
Knobs.—"Norwalk." New list.....dis 30 %
Silver Glass.....dis 50&10 %
" Bell Pulls.....dis 50&10 %
Lanterns.—Tubulars, No. 0.....₩ doz 9.00
Railroad, Oil, No. 43.....₩ doz 9.00
Trianguiar.....₩ doz 4.00
Hurricane.....dis 20 %
Lead.—Sheet.....₩ ℔ 8½c
Pipe.....₩ ℔ 8 c
Locks.—Norwalk Genuine Bronze Goods.....dis 30 %
Eagle Cabinet.....dis 10 %
" Trunk.....list net
W. Wilcox & Co., Padlocks.....dis 33⅓ %
American Lock Co.'s Steel Key.....dis 33⅓ %
Manure Forks.—W. C. & Co.....dis 40 %
Mattocks.—K. P. & Co., Long Cutter, 10.00 ₩ doz.
K. P. & Co., Short Cutter, 12.00 ₩ doz.....dis 30 %
" " Pick " 16.00 ₩ doz.....dis 30 %
Measuring Tapes.—Eddy's.....dis 10 %
Meat Cutters.—Miles' Challenge.....dis 30 %
Hale's, (New list).....dis 40 %
American.....dis 25 %
Money Drawers.—Tucker's Alarm.....₩ doz $22.50
Mouse Traps.—Delusion.....₩ doz 2.00
Novelty.....₩ doz 1.75
Nails......₩ keg, rates 3.00
Oilers.—Zinc and Tin.....dis 45 %
Brass and Copper.....dis 45 %
Ox Bows.—Extra finished and varnished.....list net
1¾ in., ₩ doz. pair..$5.75 | 2 in., ₩ doz. pair....$9.00
1⅞ in., " " 8.00 | 2⅛ " " 11.00
Padlocks.—W. Wilcox & Co.'s.....dis 33⅓
Miller's Brass.....₩ doz $7.50
Paper.—Tarred Sheathing.....₩ ℔ 2½c
Dry Sheathing.....₩ ℔ 2½c
Picks.—K. P. & Co., Adze Eye, 5 to 6 ℔ 12.00....dis 30 %
" " " 6 to 7 ℔ 13.00....dis 30 %
Planes.—Greenfield Tool Co.....dis 25 %
N. Y. Tool Co.....dis 35 %
English Iron.....dis 20 %
Bailey's.....dis 20&10 %
Plated Ware.—Rogers & Bro.....dis 33⅓&5 %
Pliers.—Vom Cleff & Co.'s.....net list
Button's Wire Pliers.....dis 33⅓ %
Plumb & Levels.—Stanley, R. & L. Co..dis 60&10 %
Pocket Knives.
American Shear Co.'s.....dis 33⅓&10
Potato Diggers.—W. C. & Co. reduced list...dis 40 %
Pulleys
Acme or Excelsior, 1¾ in.....per doz 33c
" " 2 in..... " 38c
Pulley Blocks.....dis 40%
Pumps.—Union Manufacturing Co.
Iron Cistern.....dis 35 %
" Pitcher Spout.....dis 35 %
Copper.....dis 40 %
Rivets.—Black.....dis 40 %
Carriage in 25 ℔ papers.....dis 20 %
Copper.....dis 25 %
Razor Strops.—Torrey's.....Full list
Rules.—Stanley.....Boxwood, dis 55&10 %
" Ivory dis 45&10 %
Sadirons.—Common.....₩ ℔ 4½c
Laundry.....₩ ℔ 6c
Tailor's Geese.....₩ ℔ 6c
Enterprise, "Potts".....dis 20 %
Sash Locks.—King & Hutchinson's, new list..dis 40 %
Hopkins & Dickinson's.....dis 40%
Sandpaper.—Baeder & Adamson.....dis 25 %
M. B. & D.....dis 25&5 %
Sash Weights.—Patent Eye.....₩ ℔ 2 c
Saws.—Hand Saws, Disston's.....dis 20 %
Wheeler & Clemson.....dis 20 %
Cross-Cut Saws.
W. M. & C., Common Tooth, No. 1.....₩ foot 40c
" " Champion " .....₩ foot 40c
Disston's, Common " .....₩ foot 44c
" " Gt. American " .....₩ foot 44c
Boynton's Lightning " .....₩ foot 50c
M. B. & D., Hand Saws.....dis 25 %
W. M. & Co.'s Circular Saws.....dis 35 %
Richardson Bros.....dis 25 %
Saw Blades.—Disston.....dis 20 %
W. M. & C.....dis 25 %
Welch & Griffith, Extra.....₩ doz $8.40
" " No. 2.....₩ doz 7.00
Scales.—Fairbanks.....dis 20 %
Screws.—Aiken's Flat-Head Iron.....dis 35 %
American Flat-Head Iron.....dis 35 %
" " Brass.....dis 25 %
" Round-Head " .....dis 10 %
" " Iron " .....dis 25 %
Grilley " Nickel-plated Common.dis 40 %
Scythes.—Clippers, in boxes.....₩ doz $9.00
Shaves.—Kimball's.....₩ inch 75c
Watrous.....dis 15 %
Shears.—American Shear Co., new list.....dis 70 %
Shot.—Tatham's.....₩ ℔ 9½c
Shovels.—O. Ames, new list.....dis 10 %
O. Ames, other brands, new list.....dis 10 %
M. B. & D. " " .....dis 10 %
Oxford Birmingham Pattern.....dis 45 %
Sinks.—Magee Patent.....dis 25 %
Snow Shovels.—Malleable tips.....₩ doz $4.00
Skates.—Union.....dis 25 %
Acme.....dis 20 %
Stock and Dies.—King's.....dis 10&5 %
Tacks.—A. Field & Son's.....dis 20&10 %
Pittsfield.....dis 20&10 %
Swedes Tinned.....35&10 %
Swedes Iron.....20&10 %
Gimp and Lace.....20&10 %
Copper Tacks.....25&10 %
All balances on list.....20&10 %
Traps.—Oneida, Genuine.....dis 33⅓ %
Oneida, Imitation, H. & N.....dis 50 %
Blake's.....dis 40 & 5 %
Tree Scrapers.—No. 1.....₩ doz. $2.50
No. 2.....₩ doz 3.50
No. 3.....₩ doz 4.50
Vises.—Simpson's Adjustable.....dis 25 %
Howard Vise Co.....dis 20 %
Prentiss'.....dis 20 %
Weather Strips.—Packer's.....₩ doz $4.50
Browne's Flexible Rubber.....dis 30 %
In 20 feet boxes; No. 1, ½ in. wide, ₩ yard, 10c.; No. 2, ⅝ in., 12c.; No. 3, ¾ in., 20c.; No. 4, 1 in., 25c
Black Walnut Spring Weather Strips.....₩ doz. $3.00
Window Springs......dis 20 %
Babcock's No. 3.....₩ gross $6.00
" " 4.....₩ gross 4.00
Wire Cloth.—"Clinton".....₩ ft. 0
Wire Fence.
Scutt's Patent, Painted.....₩ ℔ 9½
" Galvanized.....₩ ℔ 10&10
Wire Goods.—Gate Hooks and Eyes, &c., new list.....dis 50&10 %
Wrenches.—A. G. Coe's.....33⅓ %
Girard Mfg. Co.....dis 33⅓&10 %
Girard Agt.....dis 40 %
Wringers.—Universal, No. 2.....₩ doz $20.62
Universal, No. 2½.....₩ doz 24.00
Novelty, No. 10.....₩ doz 63.00
" No. 2.....₩ doz 66.00
" No. 22.....₩ doz 70.00
Excelsior, No. A.....₩ doz 78.00
" No. B.....₩ doz 80.00
" No. CC.....₩ doz 108.00
Novelty Set Tub, E.....₩ doz 69.00
Eureka.....₩ doz 47.00
Keystone, Wood Frame No. 178.....₩ doz 54.00
" Iron Frame No. 289.....₩ doz 54.00
Zinc......₩ ℔ 7½c

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It is a common method to advertise Governors *without cost*, unless satisfactory to the customer, and then charge *High Prices* for doing what any good Governor will do. Various Governors inferior to the "Judso" are sold in this way, operating well enough for three months, to insure collection of the pay, but becoming useless after a year's wear—their construction lacking durability. The Judson Governor is guaranteed to be not only the best Regulator of Steam Engines, but also the most durable Governor made. Parties in buying other Governors should stipulate that their durability be guaranteed, and should also take care that they do not, for much inferior Governors, pay higher prices than to those shown in the accompanying list. We guarantee the Judson Governor will do all any other Governor can do, and in accuracy and durability—the main essentials—we guarantee it shall do more.

Reduced Price List.

OCTOBER 15, 1878.

☞ For dimensions of Governor, see Illustrated Price List.

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Improved Steam Governor.

Size, Inch.	Plain.	Bright Finished.	Extra for Spe'd'r	Stop Valve.
½	$15.00	$17.00	$1.90	....
¾	16.00	18.00	1.90	....
1	18.00	20.00	2.00	....
1¼	20.00	23.00	2.25	....
1½	23.00	27.00	2.50	$6.00
2	27.00	31.00	2.75	7.50
2¼	32.00	37.00	3.25	9.00
2½	36.00	41.00	3.50	11.00
2¾	40.00	46.00	3.75	12.00
3	45.00	52.00	4.25	14.00
3½	54.00	62.00	4.50	17.00
4	64.00	73.00	5.00	21.00
4½	74.00	84.00	5.50	25.00
5	84.00	95.00	6.00	31.00
5½	97.00	109.00	6.50	37.00
6	112.00	125.00	7.00	42.00
7	132.00	146.00	8.00	53.00
8	160.00	176.00	9.00	60.00
9	180.00	198.00	10.00	75.00
10	200.00	220.00	12.00	....

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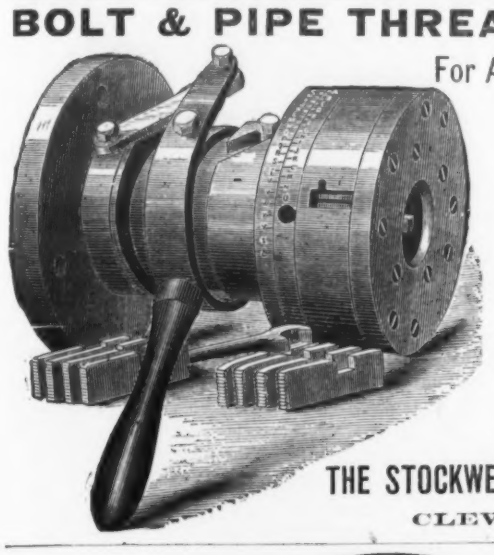

No. 0	threads	¼ to ¾	inch.
No. 1	"	¼ to 1	"
No. 2	"	¼ to 1½	"
No. 3	"	¼ to 2	"
No. 4	"	½ to 3	"
No. 5	"	¾ to 4	"
No. 6	"	2 to 6	"

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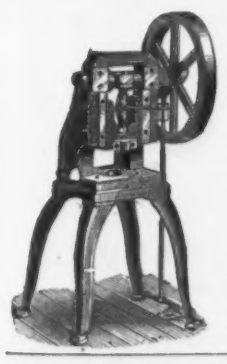

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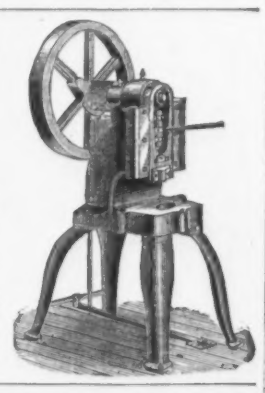

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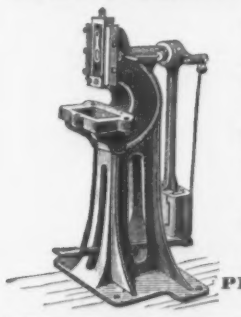

Punching, by foot, *3-4* hole in *5-16* iron 6 inches from edge.

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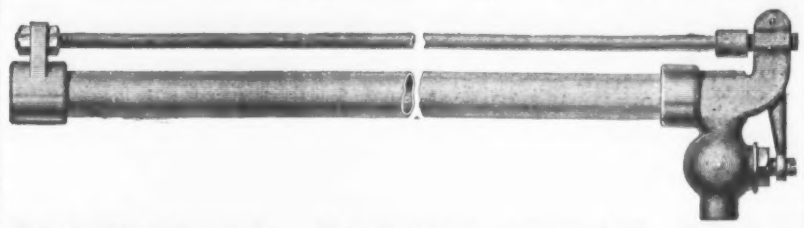

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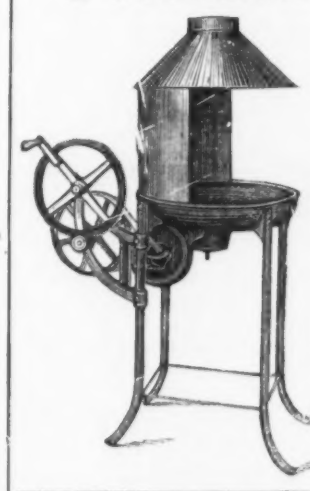

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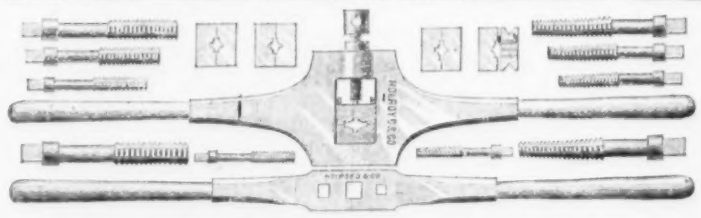

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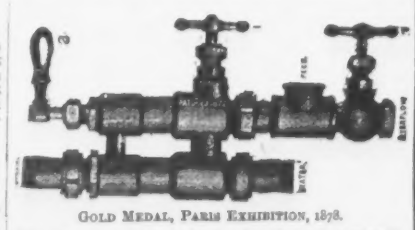

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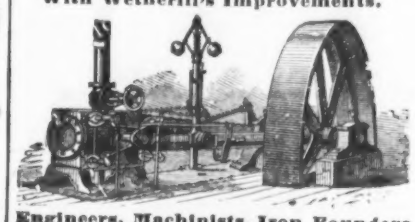

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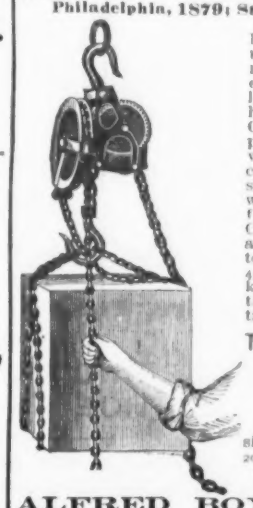

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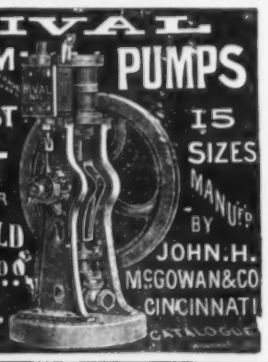

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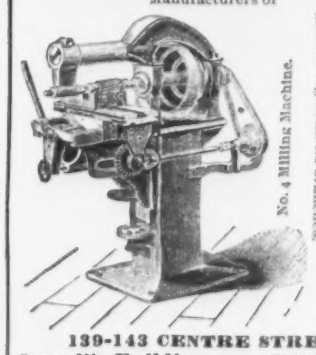

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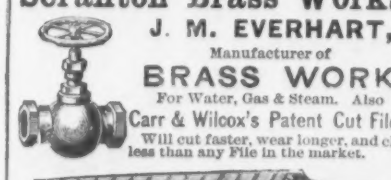

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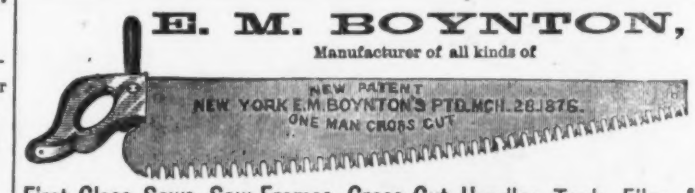

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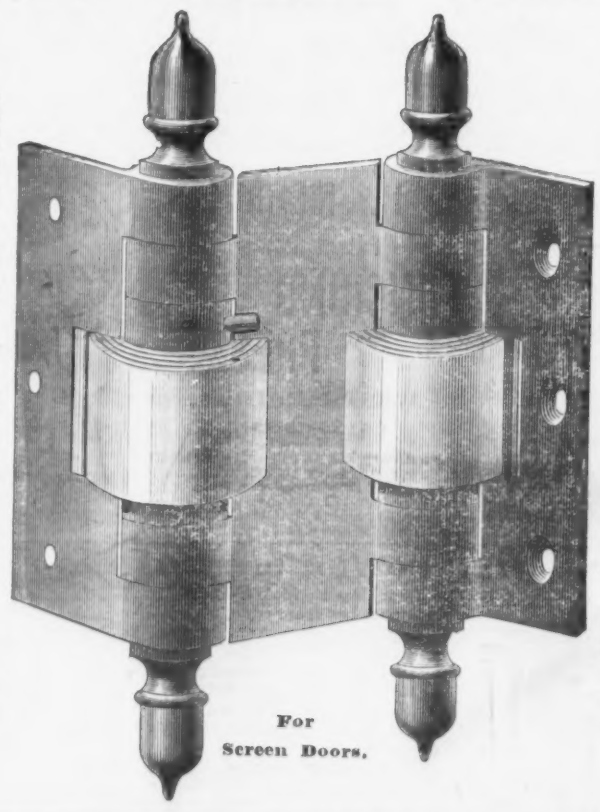

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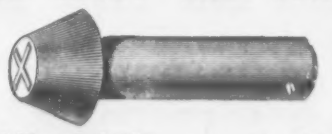

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